

THE FAR EASTERN

REVIEW

FOUNDED BY GEORGE BRONSON REA
37TH YEAR OF PUBLICATION

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上海黃浦灘
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遠東時報

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No. 3



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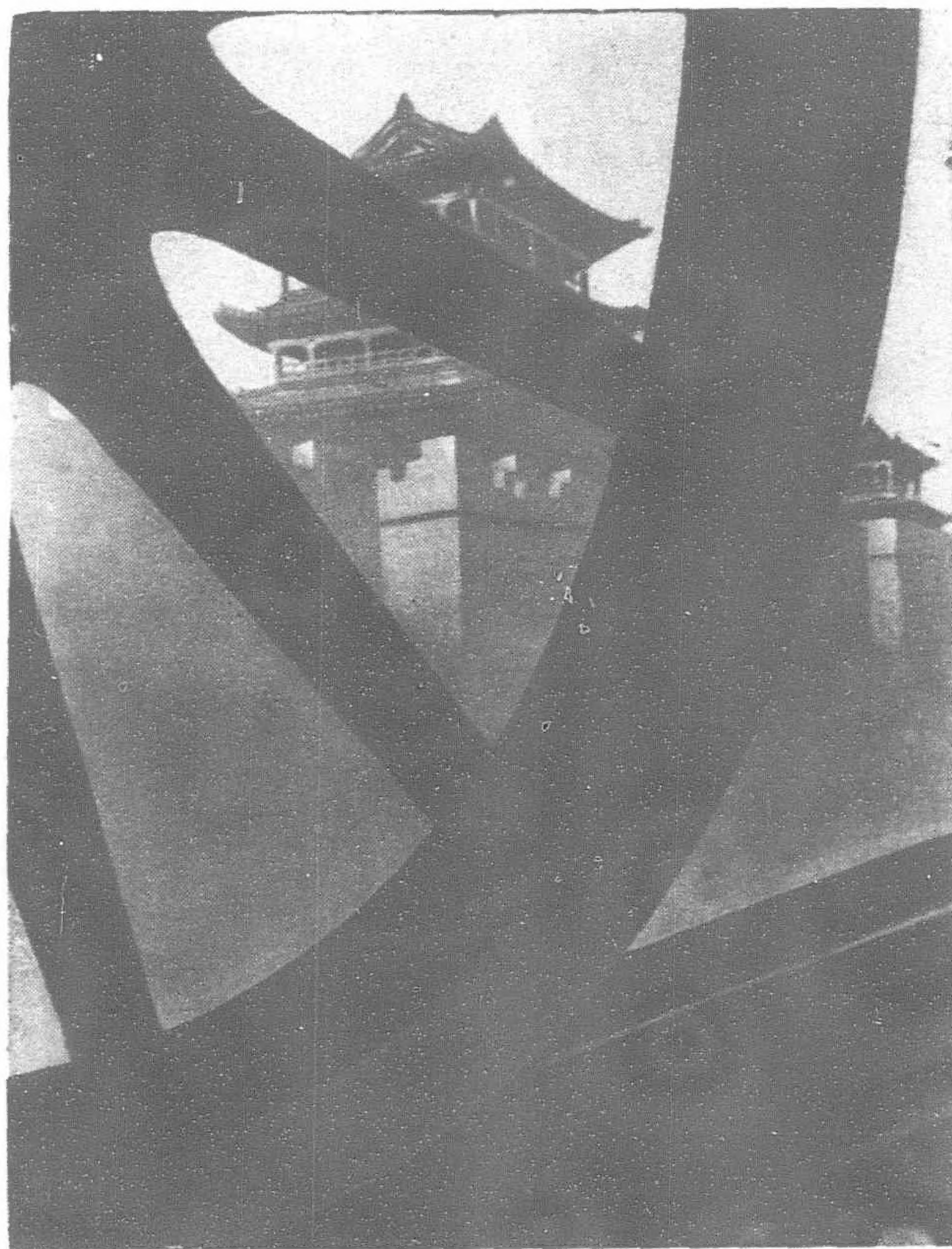
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The Far Eastern Review

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VOL. XXXVII

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FAR EASTERN CROSS-CURRENTS

Providing for the retrocession to Thailand of large portions of territory in Laos and Cambodia which were secured by France under a series of conventions with Siam during the 19th and 20th centuries, the terms of the mediation proposed by Japan for settlement of the Thai-French Indo-China border conflict were signed at the official residence of the Premier at 4 o'clock on March 11.

This was announced in a communique by Japan, France and Thailand announcing the conclusion of the mediation conference which was issued by the Board of Information. The announcement read:

"Since the mediation conference for settlement of the Thai-French Indo-China border dispute opened in Tokyo with its first formal session held on February 7, three informal meetings have been held, besides daily individual conversations in which the mediators have steadily exercised their good offices to bring about an agreement of views of the two countries concerned.

"As a result of these endeavors, it became clear that an agreement could, in all probability, be reached. The mediators, therefore, presented a plan of mediation at the fourth informal meeting held on February 24, following which they continued to persuade the two parties concerned to accept that plan.

"The governments of France and Thailand accepted it with some modifications and initialled the terms of mediation.

"The essential points of the mediation terms are as follows:

(1) France cedes to Thailand the district of Paklay which is mentioned in Article 11 of the Convention between France and Siam concluded on February 13, 1904, and the region lying to the north of the boundary line between the provinces of Battambang and Pursat, and the region lying on the right bank of the Mekong River bounded in the south by a line running northward along

longitude from a point touching Grand Lac and the southernmost end of the boundary line between the provinces of Siemreap and Battambang, to the crossing point of that longitude and a line of 15 degrees of latitude and then eastward along that line of latitude to the Mekong River. However, a small area lying opposite to Stung Treng, on the Mekong River, is reserved to French Indo-China.

(2) All of the above-mentioned ceded territories are to be made demilitarized

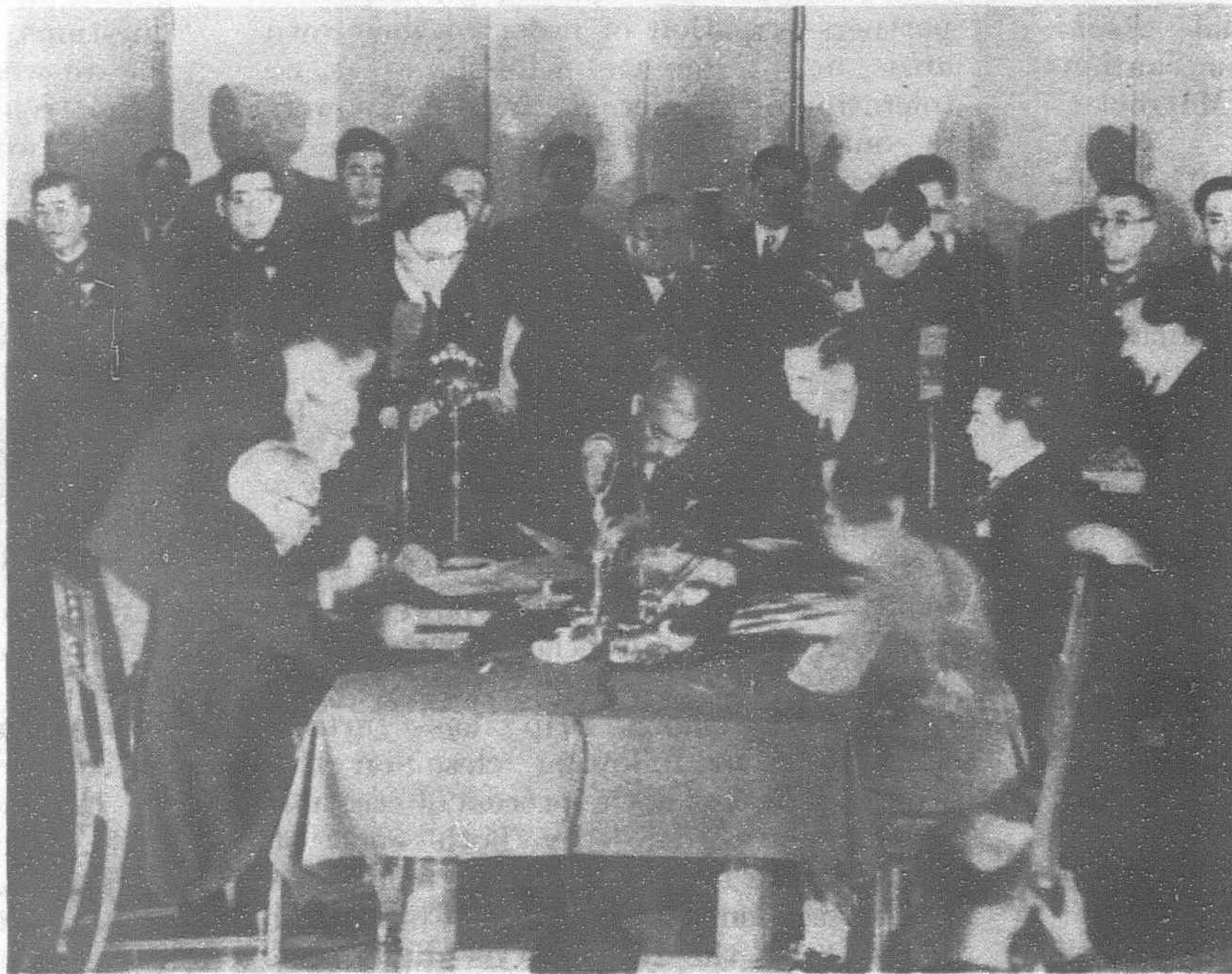
of the deep water channel, but the two islands, namely Khong and Khone, will be under the sovereignty of Thailand, and shall be jointly administered by France and Thailand, and existing French establishments on the islands shall belong to France.

In signing the above-mentioned terms, mediation letters were exchanged between Japan and France and between Japan and Thailand which clarified the effect that Japan guarantees the definitive nature of the settlement of the dispute by the afore-

mentioned terms of mediation and that agreements will subsequently be made with respect to the maintenance of peace in Greater East Asia and the establishment and promotion of especially closer relations between Japan and Thailand and between Japan and French Indo-China.

Territory ceded by France to Thailand is roughly that which France acquired under the conventions of October 7, 1902, referring to the Pak Lay territory in Laos; of February 13, 1904, concerning the Pakse district in southwestern Laos; of February 23, 1907, dealing with Battambang, Siemreap and Sisophon in Cambodia.

Friendly and peaceful relations between France and Thailand will thereby be restored and the bond of friendship that binds Japan, France and Thailand will further be strengthened."



J. P. L. Photo

Scene at the official residence of the Japanese Prime Minister showing Foreign Minister Yosuke Matsuoka giving congratulatory address to the assembled delegates of Thai and French Indo-China at final peace conference

zones and French nationals and the people of French Indo-China are to enjoy absolutely equal treatment with the nationals of Thailand throughout these areas with respect to their entry, domicile and occupations and their pursuit.

(3) The government of Thailand will respect the mausolea of the Luang Prabang Royal House situated in the triangular zone lying opposite to Luang Prabang, and afford facilities for its preservation and worship, etc.

(4) The Mekong frontier will be fixed in accordance with the principle

Reaction At Washington

France having given in to Japan regarding the Indo-China and Thai dispute, it remains to be seen what Japan will do as a result and how strongly she intends to establish herself in Indo-China, state observers at Washington.

However much Thai gets from the French surrender, Japan is expected to take as much or more in French concessions but whether Japan will then move southward is still a matter of much speculation.

The British intention to resist in that event is certain and it is learned on good authority that the Netherlands East Indies, if attacked, will formally declare war. This is regarded as important inasmuch as the East Indies are known to have a first-line air force running into hundreds of late model American planes, all regarded as superior in performance to anything Japan has.

The only remaining question mark is what the United States will do in the event of a Japanese attempt to take over Singapore, the East Indies or both. It is believed the Administration is deliberately keeping the Japanese guessing but from feeling current in Washington it can be said that it would not be safe to bet on United States inactivity.

Matsuoka Goes To Europe

With the successful conclusion of the Tokyo Mediation Conference settling the Thai-French Indo-China border dispute sharing the editorial spotlight with the departure of the Foreign Minister, Mr. Yosuke Matsuoka, on a visit to the Axis capitals, leading Japanese dailies discerned tremendous significance in these two developments.

Stating that these events showed that Japanese diplomacy was "active and healthy" the influential *Asahi*, however, sounded the hope for cautious and grave deliberation in Mr. Matsuoka's activities in Rome and Berlin.

"Inasmuch as it is just the time when rumors indicate an impending aggravation of the European conflict, it is to be expected that the trip will arouse various world-wide speculations. Therefore, it goes without saying that it is widely hoped that this envoy to distant lands will not run counter to this Imperial mission by acting only after calm and grave deliberation," the *Asahi* stated.

The paper recalled that the Imperial Rescript issued on September 27, 1940, when the Tripartite Pact was signed, emphasized that Japan's objective lay in "enabling each nation to find its proper place and all individuals to live in peace and security," while expressing the hope "that cessation of disturbances and the restoration of peace will be realized as swiftly as possible."

The main purpose of Mr. Matsuoka's trip would be to make very strong efforts toward the conclusion of a Russo-Japanese non-aggression pact, reliable quarters in Tokyo said.

Clarification of Japan's relationship with the Axis, especially in regard to the Far East, was believed to be another reason behind the Foreign Minister's trip. But, informed quarter believed, his main efforts would be concentrated on Russo-Japanese relations with all emphasis on the possibility of signing a non-aggression pact.

Mr. Yosuke Matsuoka has been considering such a trip for some time, it was understood, and was only prevented from carrying out his intentions earlier, because of the delay in the conclusion of the Thai-French border dispute.

Mr. Matsuoka, according to reliable quarters, was catching the same trans-

Siberian train on which Major-General Eugene Ott, German Ambassador to Tokyo, would travel to Berlin.

General Ott left Tokyo on March 8 to make connections with the trans-Siberian train.

Observers also attached significance to the Foreign Office's announcement that the former Finance Minister, Mr. Kazuo Aoki, had been appointed an economic adviser of the Foreign Office.

Mr. Aoki, together with two other advisers, Mr. Toshio Shiratori, former Ambassador to Italy, and Dr. Yoshie Saito, former official of the South Manchuria Railway Company, would be responsible for Foreign Office Affairs during Mr. Matsuoka's absence, it was believed.

The length of Mr. Matsuoka's stay in Berlin is not yet certain, and it also was not known whether Count Galeazzo Ciano, Italian Foreign Minister, would go to Berlin especially for the occasion. Mr. Matsuoka will not visit Vichy, it was said.

"It is symptomatic and significant that the trip occurs at the same time as passage of the lend-lease bill," an authorized source said. Things that are to be discussed will be actualities, obviously including military questions.

"It is interesting to recall in this connection the principles of the tripartite partners—creation of order in their own areas, no interference in foreign areas, no toleration of interference by other powers in our own areas and prevention of extension of the war. It can be assumed these will be the principle points under discussion when Mr. Matsuoka arrives," the Berlin spokesman added.

Questioned what was meant by military questions to be discussed, authorized sources said, "it must be remembered that the main purpose of the tripartite pact is preventative—prevention of more countries entering the war. If a foreign country shows eagerness to attack one of the three powers then it is a matter for the others effectively to leap to its aid."

The Matsuoka trip has further significance in following close on the heels of "success in the process of creation of the new order" by both ends of the German-Italian-Japanese triangle—Japan's settlement of the Indo-China-Thai dispute and the recent Axis diplomatic strokes in Europe, authorized sources said.

They expressed particular gratification over Mr. Matsuoka's trip since it was the first time a Japanese Foreign Minister has left Japan since 1905.

Mr. Matsuoka was scheduled to leave the Manchukuan border town of Manchuli March 17, presumably with General Eugene Ott, German Ambassador to Tokyo.

"As Japan's Foreign Minister, I am going on an important mission," Mr. Matsuoka stated. "However, there is no specially hidden mission," he said.

Reaction In U.S.

It is generally assumed at Washington that while ostensibly the purpose of Mr. Yosuke Matsuoka's visit to Europe is to see German leaders, his call at Moscow

may be of greater importance. It is recognized that at present it is impossible for Germany to do anything to assist Japan in her expansionist plans in the Pacific, but Russian activity in the Far East and Russian assistance to China could unquestionably be embarrassing to Japan, hence the necessity for the Japanese Foreign Minister of trying to do what the new Ambassador in Moscow has failed to do.

It is recalled that not since 1905, when Marquis Komura visited the United States to sign the Treaty of Portsmouth, has a Japanese Foreign Minister left Japan, which is a clear indication of the importance of Mr. Matsuoka's trip. Nor does Washington lose sight of the fact that Mr. Matsuoka goes to Moscow at least as a suppliant.

The *Washington Star* says Germany unquestionably would like Japan to attack Britain now. "But for Japan to strike before Britain is practically beaten by Germany would mean a supreme gamble with national ruin as the penalty for failure. In such a war, what would America do? What would Russia do?"

It is thought conceivable, though still doubtful, that Mr. Matsuoka may get an answer to one of those important questions, but in Europe he cannot learn the answer to the query about America, which remains the far more important of the two. In addition, he is probably aware of the fact that the good relations he professes to be anxious to secure with America cannot be achieved by a visit to Berlin or other Axis capitals. Indeed, feeling at Washington undoubtedly is that such a trip must be regarded, at least indirectly, as unfriendly towards the United States. It will certainly do Japanese-American relations no good.

German Opinion

Interference by Britain and America in Asia necessitates Japan's participation in war developments, the *National Zeitung* said in a leading article on March 12.

Commenting on the forthcoming visit of Mr. Yosuke Matsuoka, Japanese Foreign Minister, the newspaper said that "progressive interference by the United States of America and the irresistible advancing dissolution of the British Empire permit Japan's role in current war developments to become ever more importantly visible."

The newspaper said that many threats against Japan have been heard recently from England and the United States, and the threats in some places "already have grown into active measures—against the Far East Island empire—which one may describe as belligerent actions."

England, the newspaper asserted, obviously is trying to spread the war to distant continents and therefore "these facts demand urgent counter measures" from the Tripartite Alliance powers.

Seeks Soviet Friendship

Declaring that the building of friendly relations between the Soviet Union and

Japan is a "fundamental" necessity in solving all pending problems between the two countries, Mr. Yosuke Matsuoka revealed on February 24 that negotiations for a commercial treaty were progressing.

Replying to an interpellation by Mr. Sekijiro Fukuda, in the Accounts Committee of the Lower House, the Foreign Minister disclosed that negotiations for the freedom of business, trade and residence in the Soviet Union were expected to be included in the trade conversations.

The problem of Japanese rights in Saghalien, which has been discussed intermittently between the two countries also will be studied in parallel conversations with the talks for a commercial treaty, Foreign Minister Matsuoka said.

He added, "Regardless of whether or not the trade conversations are being carried on, this negotiation will be continued."

Expressing the desire to work for the solution of these problems, Mr. Matsuoka stressed "After all the building up of friendly relations is a fundamental condition. If this is brought about, the problems will be settled too."

British Viewpoint

Britain probably will answer the trip to Japan's Axis partners by Mr. Yosuke Matsuoka, Japanese Foreign Minister, by giving more help to China, reliable British quarters said.

They believed that the new aid would consist of Britain's construction of a 100-mile railway from Lashio to the Burma-Yunnan frontier.

Britain also might assist the Chinese in accelerating the construction of a corresponding railroad from the frontier to Kunming and to Rangoon, these quarters added.

British quarters believed that Mr. Matsuoka was determined to attempt to conclude a Russo-Japanese non-aggression pact or a similar arrangement.

He also probably would discuss with Chancellor Adolf Hitler plans for synchronizing Japanese and German military action during the spring, they thought.

His visit to Rome, they continued, was mainly for the purposes of propaganda as Japan and Italy seem at present unable to offer each other much more than bouquets.

Diplomats did not exclude the possibility that Mr. Matsuoka might try and enlist Chancellor Hitler's mediation between China and Japan despite the failure of such an attempt in 1937.

Lend-Lease Bill Under Fire

Vigorous denunciation of the American Lend-Lease Bill in the leading Japanese newspapers followed the enactment of the measure at Washington.

The Japanese papers in general profess to see in the Lend-Lease Bill "the first United States step towards war."

Both the *Miyako* and the *Hochi* saw America entering the war as a result of the enactment of the Lend-Lease Bill. Pointing out that Britain did not need men, but war materials, the *Hochi* said, "The passage of this bill is tantamount to giving all help America can extend to Britain."

The *Miyako* foresaw trouble ahead for the United States. The paper declared, "This hazardous war boom policy which has been undertaken to overshadow the dead end reached in New Deal policies, will not bring about world peace, but instead precipitate a violent armaments race and war."

"The American people who hitherto lived in a solitary oasis-like paradise

States Navy could defeat the Japanese Navy in American waters but fighting in Japanese waters "might be suicidal."

Senator James M. Tunnell, Sr., Democrat of Delaware, declared that "those who argue that should Britain fall Chancellor Adolf Hitler would not bother us or any south American country, in the light of his secret agreement with Japan are just kidding themselves and the American people."

Senator Burton K. Wheeler, Democrat of Montana, asserted that the Administration's opposition to the Ellender amendment to the Lend-lease Bill "gives great force" to the reports that American troops would soon be sent to Singapore.

He alleged that soldiers were being trained at Fort Bliss, Texas, and San Diego, California, in methods to be used in defending Singapore.

The Ellender amendment was sponsored by Senator Allen J. Ellender, Democrat of Louisiana, who would prohibit the dispatch of U.S. troops to foreign soil outside the western hemisphere and United States possessions.

Factors In the Pacific

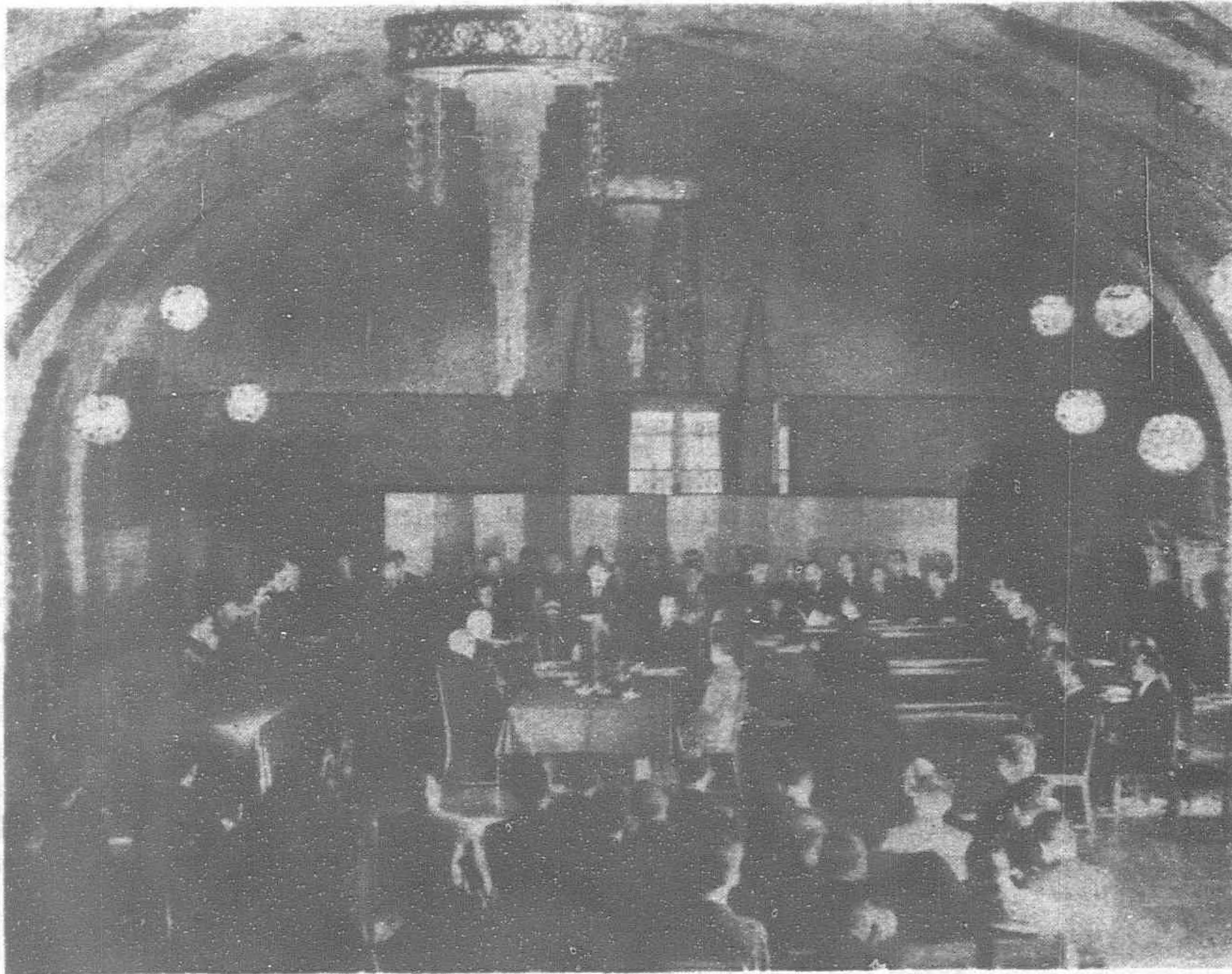
Secretary of State Cordell Hull, in the course of secret testimony before the Senate Foreign Relations Committee, in January, stressed that the Administration's immediate fear is Japan, despite emphasis on the German threat in official statements, Mr. Ludwell Denny, editorial writer of the *New York World-Telegram* reported.

The Government's chief apprehension is possibility of war with Japan if the United States were to help Britain defend Singapore or vital routes linking the British naval base with French Indo-China and Thai, Mr. Denny said.

Going on to assail the Administration's Far Eastern program, the writer asserted President Roosevelt and Secretary of State Hull will find it hard to explain the aid-to-Britain policy in the Pacific, as considerable outright opposition exists among Americans to risking war for Singapore and India or for rubber and tin in the Netherlands East Indies.

The Administration's chief problem, Mr. Denny said, is to persuade the American public and Congress that it is protecting American instead of British imperial interests in the Far East.

The writer continued that the Administration's statements regarding the danger of a Nazi invasion of the United States are now a boomerang, because the general reaction seems to be that if the United States is in danger of having to fight in defense of the Western Hemisphere, it would be suicide to tie up the United States fleet and air force in an Asiatic war.



Signing of the protocol bringing to an end the border dispute between Thailand and Indo-China following Japanese mediation. Foreign Minister Matsuoka is seen signing

for humanity located in the Western Hemisphere, are being driven into arms factory galleys by the whip of one ambitious man," the *Miyako* declared.

The *Yomiuri* said that the present situation recalled that of February 1917, when Germany announced unrestricted submarine warfare. "It is said that history repeats itself. We find it our duty to retort to Britain and America by warning them of the danger that lies in the Atlantic," the paper added, predicting that the United States eventually would form convoys of its own merchantmen escorted by American warships to send war materials to Britain.

Japan Figures In Debate

Japan's armed might figured prominently in the heated debate in the Senate over the lend-lease bill.

One senator cited "Hitler's secret agreement with Japan" as one of the most vital reasons that quick passage of the bill was needed, and another senator, speaking against the bill, said the United

Under such circumstances, American opposition to a United States naval stand in the far Pacific, Mr. Denny concluded, is not limited to isolationists and anti-interventionists but is shared equally by many vigorous advocates of aid-to-Britain.

U.S. Stake In Indies

Any military invasion of the fabulous Netherlands East Indies would jeopardize American investments conservatively worth U.S.\$1,500,000,000 a United Press survey purports to reveal.

Source of 38 per cent of American rubber supplies, the fall of this highly productive archipelago into enemy alien hands would produce an acute shortage of rubber in the United States and cripple many industries, according to American rubber men.

Two of the largest American rubber companies own their own rubber plantations in the N.E.I. Official American sources conservatively estimate the value of these two plantations, each covering roughly 100,000 acres, at more than U.S.\$500,000,000.

Forty per cent of the substantial N.E.I. oil production is controlled by an American company. Its properties and producing wells are estimated to be worth well over \$300,000,000.

Several large American companies operate manufacturing plants in Java, shipping the unfinished product here from the United States for finishing. General Motors Co. employs 600 workmen in its plant and in 1940 produced nearly 5,500 trucks and motor-cars. Goodyear Tire & Rubber Co., Proctor & Gamble and other large American firms own and operate large plants in Java.

"Actually, the Netherlands East Indies is of more irreplaceable value to the United States than any other comparable area in the world," one American business man said.

Apart from rubber, the United States is dependent on the N.E.I. for much of its tin, virtually all of its quinine, and for substantial amounts of palm oil, spices and other products.

The vigorous defence measures being rushed by the Dutch as a precaution against possible invasion include protection of American properties in the islands. American-owned industrial plants have been camouflaged to blend with the countryside and ample air-raid shelters to accommodate all workmen have been constructed close by.

In the case of the oil and mining properties, all plans have been made to destroy quickly all American-owned as well as Dutch-owned properties. In the oil fields, the man who will dynamite each well has been designated and needs only the order to set off a charge designed to make the well useless to an invader.

Although the Dutch feel they would receive the sympathetic support of the United States in event of attack, the Batavia government is proceeding on the theory the N.E.I. must be prepared to fight off invasion alone. All available funds are being poured into training and

equipping a substantial army, a strong air force and a small but efficient navy. Greatest pride is in the air force which is equipped with several hundred late type American fighting planes of all categories.

Dutch defence from invasion would center around the air force. Without a first class navy, Dutch military men realize it would fall to the lot of the air force to fight off an invading navy and air force. The colonial army would meet the invasion only in the event that an attacker effected a landing. The army has been made highly mobile, utilizing many hundreds of armored trucks quickly to transport troops over Java's excellent network of highways to any given point.

Guam and Samoa

Senator David I. Walsh, Chairman of the Senate Naval Affairs Committee, told the press that the Navy Department considers the Guam and Samoa projects "essential for United States defence and therefore fully justified" after his committee had unanimously approved both projects.

He disclosed that both the fortification of Guam, only 1,500 miles south of Japan, and Samoa had received the fullest support from all committeemen. His committee had unanimously approved the U.S.\$242,000,000 naval expansion bill. Of this sum, U.S.\$4,700,000 will be spent immediately on improving Guam's defences and harbor facilities, he added.

Senator Walsh said that the general theory of converting Samoa into a naval air station was its utility as a guardian of the American air route to Australia.

Earlier, Admiral Morrell has testified that he desired to convert Samoa into a large air station.

Asked whether the Navy realized the strategic disadvantages of Guam since it was located in the center of the Japanese Mandated Islands, Admiral Morrell declared, "We are operating planes in the Philippines and need Guam as a way station on flights between Hawaii and the Philippines."

He added that the Navy intended to remove coral heads from the harbor within six months, but expected to take 18 months to build a breakwater. He disclosed that recently some seaplanes were nearly wrecked there is bad weather.

Philippines Defences

Publication of hearings on the fourth supplemental national defense appropriation bill disclosed steadily expanding U.S. Army and Navy activity in the Philippines. The hearings showed that the Army and Navy both contemplated continued expansion and improvement of the shore defense facilities which have been virtually at a standstill for six years.

Naval officials told the House Appropriations Committee that they wanted to use U.S.\$1,600,000 for the construction of an ammunition depot at Marveles, Philippines—a project under contemplation since 1928.

Admiral Ben Morrell, Chief of Civil Engineers, testified in this connection,

"Because of the uncertainty of the situation in the Philippines nothing can be done about the project....."

Very recently the strategic situation in the Philippines became such that the Navy Department is desirous of constructing a station to store ammunition."

The Navy Department also has asked for U.S.\$32,000 for improvements at the Cavite air station in the Philippines and U.S.\$100,000 for repairs and improvements to the Dewey drydock at Olangapo naval station.

The War Department has asked for U.S.\$500,000 for hard-surfaced runways for the Army air stations in the Philippines and for two new pursuit squadrons to be stationed there, U.S.\$185,000 for miscellaneous construction in the quartermaster's department and U.S.\$120,000 to complete improvements on buildings and utilities at Philippine Army posts.

This unprecedented flurry of defense requests for the Philippines was asked to be included in the same appropriation in which the Navy asked for U.S.\$4,700,000 for Guam harbor improvements and U.S.\$8,100,000 for the Tutuila, Samoa, naval air station.

Moves Not Alarming

Declaring there was nothing alarming in recent United States moves to strengthen her Pacific defenses, Vice-Admiral Teijiro Toyoda, Vice-Minister of Navy, reassured the Japanese Diet that the Japanese Navy was prepared to meet any situation which may arise in the Pacific. Vice-Admiral Toyoda made the statement at the Deficit Committee meeting of the Lower House, replying to an interpellation by Mr. Koichi Seko.

The latter described the recent United States action strengthening Guam defenses as a bold step aimed at encircling Japan.

"For the purpose of strengthening Pacific defences of the United States, the House of Representatives recently approved a U.S.\$240,000,000 appropriation bill now being considered in the Senate," Vice-Admiral Toyoda revealed.

"Of this amount only about U.S.\$4,000,000 is expected to be allotted to strengthen defenses of Guam," he added.

"One should not regard this as constituting a threat to our defense. The Japanese Navy has taken all things into consideration and is already carrying out its own plans," he declared.

Japanese Naval Strength

Three 40,000-ton Japanese battleships were launched during the past year and two more such superdreadnaughts were under construction, the new volume of *Jane's Fighting Ships* reported.

Japan also has launched three 12,000 to 15,000 ton pocket battleships, which were named *Kadekuru*, *Kashino* and *Hachijo*, and is building another, according to *Jane's*.

Germany's 35,000-ton *Bismarck* possibly already is in service, while its sister ship, the *Tirpitz*, will be ready to enter

service next year, the authoritative book on the world's naval forces said.

The new Japanese super-ships are named *Nissin* and *Takamatu*, but the third is not named, *Jane's Fighting Ships* said.

The status of British battleships has not changed from the list issued in the previous annual volume.

Jane's Fighting Ships devoted considerable space to describing the rapid growth of the Soviet Fleet.

The Soviet Union officially has stated that 112 warships were completed in 1939, while 168 warships were expected to have been completed last year, *Jane's* reported.

"*Jane's* has secured independent evidence which goes far to support" Japanese reports that the Soviet Fleet based at Vladivostok includes 70 submarines and more than 50 motor torpedo boats, the annual report said.

Jane's estimated that at least 40 capital ships were being constructed or ordered throughout the world.

British Attitude

Britain had no desire to threaten or provoke any Power in the Far East but would resolutely defend her territory and security there, said the Secretary of State for India and Burma, Mr. Leopold Stennett Amery.

The recent strengthening of British forces at Singapore and in Malaya was the best argument for continuance of peace in that region, he added.

"In the Far East we have to face an uncertain situation and one of potential danger. We at least have no desire to threaten or provoke any Power in that region of the world. But we are resolute to defend our territory and our security and in that resolution—known to the world and emphasized by the recent strengthening of our forces at Singapore and in Malaya—I believe lies the best argument for continuance of peace.

"There and in the Middle East the threat is to the vital points in our Empire system of sea communications to Singapore and to the Suez Canal.

"Meanwhile the gravest danger still confronts us nearer home. Here and here alone can Hitler hope to achieve that swift decision without which he is doomed to disaster. His preparations for a direct invasion have never relaxed. Their execution, postponed again and again, may possibly never be carried into effect."

Relieves Tension

Mr. Mamoru Shigemitsu, Japanese Ambassador to Britain, has given Mr. Winston Churchill, British Premier, fresh assurances Japan does not intend to attack the British Empire anywhere in the World, official Japanese sources said at London on March 5.

The assurance was in a personal note from Mr. Yosuke Matsuoka, Japanese Foreign Minister, and was handed to Mr. Churchill by Mr. Shigemitsu, Japanese sources said.

Mr. Shigemitsu and Mr. Churchill conferred for 25 minutes discussing Anglo-

Japanese relations and Far Eastern developments, it was said.

Japanese sources said they understood Mr. Shigemitsu informed Mr. Churchill of the Thailand-French Indo-China proposals and settlement.

Mr. Shigemitsu later told Japanese journalists that the talk further contributed to alleviation of Anglo-Japanese tension and said the Pacific crisis seems dissipated.

Mr. Shigemitsu, it was understood, expressed satisfaction to Mr. Churchill over the speech of Mr. Robert G. Menzies, Australian Prime Minister, who advocated that Japan and Australia cement friendly relations.

Mr. Shigemitsu also was said to have told Mr. Churchill that the tripartite alliance was designed to prevent spread of war in the Far East.

To the Last U.S. Dollar

China will continue her "war of resistance" against Japan "no matter what happens" highest Chinese sources assert. The course of this resistance will be determined in a great measure by the amount of assistance received from the United States, according to Dr. Wang Chung-hui, Chinese Foreign Minister. Such assistance must include aeroplanes, guns, tanks and weapons, as well as monetary assistance which already has totalled U.S.\$259,000,000, since 1930.

Japan is equally determined to continue the war until China accepts a "reasonable" peace. Japanese leaders admit there will be no such peace in sight as long as United States assistance continues.

American support for China is the chief cause of Japanese-American tension. The reason such aid is given and continued was outlined by highest sources in Washington, as follows:

The United States views the Sino-Japanese conflict as a definite part of the world conflict between the Axis powers and the Democracies. The world conflict involves the future safety of the United States, because if the Axis wins, it would present a united front in every phase of activity, with which the Americans could not hope to compete.

Should Japan succeed in dominating China, American interests in that part of the world eventually would be eliminated. Because she is fighting the Axis conception of a new world order based on force, China really is fighting the United States battle.

Administration supporters concede the accuracy of the statement of the Japanese Foreign Minister, Mr. Yosuke Matsuoka, to the Diet on January 21, that the United States "apparently entertains the idea that her own first line of defense lies...even as far as China and the South Seas."

The Administration's support of China began before the present Sino-Japanese conflict started in 1937 and was carried out with increasing vigor until to-day it has reached a state which includes many measures short of actual hostilities against Japan.

Financial support includes U.S.\$29,000,000 for the purchase of United States wheat and cotton, U.S.\$25,000,000 to be liquidated by American imports of Chinese tung oil, U.S.\$20,000,000 for American imports of tin, U.S.\$25,000,000 for imports of tungsten, U.S.\$50,000,000 in commodity credit, U.S.\$50,000,000 for currency stabilization, and U.S.\$60,000,000 for purchase of strategic materials. Only U.S.\$18,500,000 ever has been repaid.

Some observers believe the money was well spent to prevent Japan from dominating China. Critics insist that the only way to save China is to send armed forces to drive out the Japanese and believe that the present policy is leading to war.

Critics of the Administration program think the Japanese are ready to accept a compromise peace and that the Chinese also would accept such a peace when United States aid proved insufficient for a counter-offensive.

They also assert that the China conflict is only a minor theater in the world struggle against Germany and that the United States strength should be used directly against Germany, instead of being dispersed.

China's Civil War

News from China which disturbs Americans at present is the continued friction between the Kuomintang and the Communists.

In an editorial under the heading "Bad News from China," the *New York Times* says the most disquieting news from China in recent weeks has been the continued friction between the Kuomintang and the Communists. This quarrel cannot be dismissed by wholly condemning either side, the paper declares. It recalls that the Communists have fought heroically against the Japanese and that their immediate objectives are democratic, yet so faithful a friend as Mr. Edgar Snow warns that their leaders are faithful to the doctrine of Moscow and plan a Communist China.

"Similarly, Gen. Chiang Kai-shek's Government has its virtues and faults, but one fact should be made clear to both sides. American sympathy and American aid have been given in the hope that China will become not only free but democratic. Americans will not give aid to support either side of a Chinese civil war. If China is to be saved with our help from the Japanese and Axis control, its embattled leaders will have to forget their divergent doctrinal objectives and to settle their present dispute peaceably."

Planes To Orient

The *New York Herald Tribune* reported in February that the United States Navy and the British purchasing mission had confirmed reports American warplanes were being flown and shipped to the Orient.

Lockheeds and Consolidated bombers built on the Pacific coast are being flown to Singapore, the newspaper said.

Seventy Curtiss pursuit planes also were said to be *en route* to China by boat.

Twelve former United States Navy pilots have been sent to the Netherlands East Indies to become flying instructors, the *Herald Tribune* also said.

The bombers were diverted from intended service to Britain and were *en route* to the Far East by a variety of routes, it was said.

"About 200 bombers are believed involved in the present ferrying operation," the paper said.

General Hata Returns

Gen. Shunroku Hata, former Commander-in-Chief of the Japanese forces in Central China and later A.D.C. to the Emperor and twice War Minister, has been appointed to his old position of Commander-in-Chief in central China, replacing Gen. Toshizo Nishio.

Gen. Nishio, who has just completed a ten-day inspection tour of North China, has been appointed a member of the Supreme War Council.

Gen. Hata will be remembered as the man who brought down the Yonai Cabinet on a demand by the Army for drastic national reorganization.

It was while Gen. Hata was in command in China that the Japanese captured Kiukiang and Hankow.

Russian Embargo Lifted

Mr. Sumner Welles, U.S. Under-Secretary of State, on January 2 notified M. Constantine Oumansky, Soviet Ambassador to Washington, that the United States has lifted the "moral embargo" on shipment of aeroplanes and petrol to Russia.

The text of a letter to M. Oumansky read:

"Following our recent conversations," the letter said, "I am happy to inform you that the Government of the United States has decided that the policies set forth in the statement issued to the press December 2, 1939, and generally referred to as the "moral embargo" are no longer applicable to the Union of Soviet Socialist Republics.

"This decision is being communicated to interested American manufacturers and exporters," the letter stated.

Mr. Welles and M. Oumansky had been conferring for more than three months on what the State Department always described as "routine matters," but observers believed the conversations were undertaken in an effort to establish better relations between the two Governments.

Withdrawal of the "moral embargo" was interpreted by neutral diplomatic observers here yesterday as a gesture for Russia's friendship and possible collaboration in the Far East.

Observers, by integrating this development with numerous others both in the United States and elsewhere, reached the conclusion that the United States felt the way was cleared for closer active collaboration with Soviet Russia, especially in aid to China, which would be the most available common ground for Russian-American co-operation.

With the United States also firmly committed to aiding China, U.S. officials for a long time have sought a basis on which America and Russia could proceed in parallel lines in the Far East, as a means of controlling Japanese expansion southward.

Many diplomatic experts believed that only the threat of Russian military power at Japan's rear restrained Japan from striking southward in the Netherlands East Indies, the Philippines and Burma at the present time.

Some expert sources suggested that removal of the moral embargo against Russia might mean increasing the supply of planes to China, if not through transshipment at least by moral encouragement of Russia's Far Eastern policy and possibly by Russia's release of planes to China which Russia subsequently might replace with purchases from the United States

Warcraft Welcomed

While Australian Royal Air Force planes dived low in salute and 21 guns from the Middlehead batteries boomed out a royal welcome, thousands of cheering and flag-waving Australians lined the shores and greeted the American naval squadron of seven vessels on their arrival at Sydney on March 20.

Bad visibility delayed the arrival of the American squadron by 70 minutes, but the thousands of Australians, men, women and children, who turned out to greet the visitors were not disappointed in the slightest.

They waved Australian, British and American flags and cheered themselves hoarse as the squadron of two cruisers and five destroyers steamed majestically into Sydney harbor.

Thousands of assorted craft, many gaily decorated and flying the Stars and Stripes side by side with the Union Jack and Australian flags, cluttered the harbor.

The 21-gun salute was the first salute fired in Australia since the war started in Europe.

The flagship of the squadron, the *Chicago*, led the American vessels in line ahead formation and tied up at 9.45 a.m.

Shortly before the arrival of the American naval vessels in the harbor, the acting Prime Minister, Mr. A. W. Fadden, sent a wireless message to Rear-Admiral John H. Newton, commander of the squadron.

"I extend you an enthusiastic welcome on behalf of the Commonwealth and the people. We have the same interests in facing similar problems and share a mutual desire to commensurate national security and live in peace with the world." Mr. Fadden said in the message.

The two cruisers led the five destroyers in coming into port and tying up.

Mr. A. W. Fadden, acting Prime Minister, announced in Canberra that the squadron will visit Brisbane following its Sydney stay.

Mr. Fadden, coincident with his announcement, paid tribute to Congressional passage of the Lend-Lease Bill and said that Australia "will go on unfalteringly and united in the valiant company of the American people."

Elaborate preparations were made to welcome the American squadron, which is an entirely different unit from the one now at Auckland, New Zealand, which is composed of six U.S. naval vessels.

Washington Comment

The United States was "very closely in touch with Australia and greatly in sympathy with her aspirations," declared Col. Frank Knox, Secretary of the Navy, in commenting on the "training cruise" of four United States cruisers and nine destroyers to Australian and New Zealand ports.

With the exception of those whose movements had already been publicized, there were no more United States naval vessels in the south Pacific, he added.

Col. Knox declared that those in the Antipodes would return shortly to Honolulu.

The American warships visiting Sydney are the cruisers *Chicago* and *Portland*, the flotilla leader *Clark*, and the destroyers *Cassin*, *Conyngham*, *Downers* and *Reid*, while those visiting Auckland, New Zealand, are the cruisers *Brooklyn* and *Savannah* and the destroyers *Case*, *Shaw*, *Cummings* and *Tucket*.

Shanghai Rice Shortage

Chinese circles and the press in Shanghai are becoming impatient over the delay in an announcement by Settlement authorities of measures to cope with the serious rice situation, and are continuing to urge that in punishing profiteers in the rice market, the authorities should not consider the "face" question, hinting that some influential people are among the hoarders. Indignation was aroused when increases ranging between \$3 and \$4 were registered in the rice market creating a record price level. Interviewed, a Chinese official of the S.M.C. stated that the Council was seriously studying the matter, but nothing definite has yet been decided upon.

"Authorities Have Not Taken Drastic Measures; Prices of Rice Went up again Yesterday" the headline of the *Shun Pao*. No matter how much rice arrives, profiteers hoard it with the result that the ready stock in the market has been diminished and that prices have gone up, it is stated. Besides having ample financial means at their disposal, profiteers are said to possess "special influence" in continuing their "illegal" acts. It is further alleged that about 1,000,000 bags of rice are stored in godowns along the waterfront in Pootung. The authorities are asked to investigate this report.

Printing a picture showing the unloading of rice on the Bund from rice boats, which is said to be a daily occurrence, the *Chinese American Daily News* urges that punishment of hoarders can no longer be delayed. It is stated in the paper's headline that absence of action may cause disturbance of peace and order. In a sub-editorial the paper says that traitorous merchants have intentionally increased prices of rice to exploit the poor and to disturb peace and order, despite the fact that supplies have been arriving continuously.



Tea Leaves from Ho Pat's Garden

by Shamus A'Rabbitt

Love is like a golf ball
It has no respect
For age, dignity or wisdom
But responds
To a certain skill

And daring—
Which makes it rise
To the heavens
Go straight
On the fairway—
Avoiding hazards—
Or to be rescued quickly
From the sands of bunkers
Until landed
In climax
In the center of
The perpetual greens
Of happiness.



Our love of the old home
Is but the sum total
Of our happy memories
Less the intensity of the struggle
To lift the mortgage.

The smoke and grime of the mills
Are rainbows on the horizon of our fancy
If they bring our heart's desire.

The fairest garden
May be wormwood
If associated with disillusionment.

Recourse to the bowl
Brings a short truce
Between us and our troubles—
But no respite
To our dependents.

The sour face
Of the teetotaler
Has driven many
A good man
To drink.

The sight of a drunk
Is enough
To cause
A decent drinker
To forsake the bowl.

The burning of our house
From the misuse of fire
Does not eliminate
Our need for heat.



We forget money spent
For pleasure
Sooner than money lent
To a friend.

When the pocket of life
Is turned inside out
The mystery is lost.

Philosophers like mile-posts
Do not carry us on
Our journey—
They direct us only
If we have the will to go.

Our opinions on marriage or morals
Usually disclose individual weaknesses.

Those happily mated lack patience
With one who has picked a lemon
From the Garden of Eden.

To brag about moderation
Is to proclaim the limitation of desire.

We blame a man's vice for his
poverty
Instead of the weakness which
causes the vice.

If it were not for the difficulty
Of separating the gold from
the dross
This precious metal would lose its lure.

Whenever an unpalatable truth is spoken
We are inclined to call it cynicism.

A keen sense of possession
Will not admit of love
Without jealousy.

A good bank balance
Makes it easy
To live up to our principles.

When in debt we have about as much chance
Of telling the world to go to hell
As a widow with six children and no
insurance.

The hardest buyers are the best payers.



European Factors in Far Eastern Diplomacy

By A. WHITNEY GRISWOLD

(Foreign Affairs)

To American eyes the Far East is a scene of rapid and bewildering change. Three times within the last four years Japan has revised her foreign policy in ways which would have been considered revolutionary if followed by the United States.

On November 25, 1936, Japan became a party to the Anti-Comintern Pact. Her relations with Soviet Russia had been going from bad to worse because of her undercover penetration of China. She had common strategical interests with Germany *vis-à-vis* the Soviet which made ideological rationalizations unnecessary. It was a "natural" alignment. Until the eleventh hour Americans expected Japan to play a part (no one knew how active) on the Axis side in the oncoming European war.

The expectation was not fulfilled. Instead, Germany made her deal with Russia, and Japan left the Anti-Comintern Front in a panic. This deal (the Ribbentrop-Molotov agreement of August 23, 1939) not only sent a Japanese cabinet toppling; it caused the next cabinet to adopt a more friendly policy toward England, France and the United States. The sincerity of the spirit underlying this new policy may be open to doubt. It nevertheless lasted as long as there was any possibility of negotiating, as between England, France, Japan and the United States, a mutually profitable and viable understanding.

Exactly when the possibility vanished, or why it never developed, is known to the statesmen in London, Paris, Tokyo and Washington. Their colleagues in Berlin and Chungking might also do some explaining. At all events, Japan on September 27, 1940, rejoined her old Axis partners, this time in a ten-year military alliance, and let it be known that a *rapprochement* with Russia was in the tea leaves.

Such an opportunist trafficking in alliances is the rule rather than the exception in Far Eastern politics. The scene has changed many times in that part of the world during the past half century, but the players remain the same and the plot consistent. *Plus ça change, plus c'est la même chose*. Japan's frequent shifts of allegiance have all been means toward a single end. It is western diplomacy, not Japanese, that has been inconsistent and erratic, and for one basic reason. The European Powers, Russia and the United States have all treated the Far East as a sphere of interest subordinate to Europe or Africa or India or the Near East or the Americas, as the case might be. Their Far Eastern policies have been as variable as the ulterior, non-Far Eastern motives by which they have been governed. Hence the periodic swapping and dickerings in the Far East, as these Powers bargained there to save what they would not place on the counter elsewhere.

During this process, the balance of power in the Far East has depended upon the balance of power in Europe. Japan has needed every bargain she could strike. Only when her rivals were divided against themselves could she hope to rule, even in her own hemisphere. Western harmony, or a balance of power which gave supremacy and freedom of action to a given combination of western nations, always spelled danger to Japan. She has never forgotten, for example, the Triple Intervention of 1895, when Russia, France and Germany denied her access to the continental foothold she had wrested from China. With France allied to Russia, and the latter a willing stooge of Germany, Japan had to wait until the European disbalance frightened England into an alliance with her before she could resume the effective pursuit of her continental goal. Then, as England built the alliance into an anti-German coalition which included France and Russia, Japan discovered more formidable limits to her continental ambitions than the decrepit Tsarist military power which she had smashed in 1905. Only the First World War, which immobilized all of these nations in Europe, gave Japan the free field she really desired. Nor did she have this to herself for long. American participation in the war and the resultant Allied victory confronted her with a formidable combination of mobilized naval, military and economic power. It forced her, in the Washington Treaties, to

apply the brakes once more. Not until this combination had first been weakened by the depression, and then put on the defensive by Italy and Germany, were the brakes released.

Conversely, it should be noted that Japan has exerted little influence on the balance of power in Europe. It is true that the Anglo-Japanese Alliance rescued England from her "splendid isolation" in 1902 and helped pave the way for the Entente Cordiale with France of 1904 and the Anglo-Russian Entente of 1907. But when the hour of trial came for England in 1914, far from relying on Japan's assistance, Sir Edward Grey tried to persuade the latter to stay out of the war. Japan made no contribution to her ally's war effort in Europe. On the contrary, as is well known, Japan's war against Germany consisted of seizing as many of the latter's Far Eastern possessions as she could get away with, badgering China with the Twenty-one Demands, and overrunning northern Manchuria and part of Siberia.

Japan's membership in the Anti-Comintern Pact evidently was not enough to insure Hitler's eastern front in the Second World War. What other reason was there for the Ribbentrop-Molotov Agreement in August, 1939? And now, even with Japan a full-fledged military ally of the Axis and a Russo-Japanese treaty in process of negotiation, it is doubtful if Hitler can expect much effective Japanese assistance in Europe. While Japan might contribute indirectly to an Axis victory by diverting American or Russian attention from Europe, the point to be made here is that, until the outbreak of the present war, the Far Eastern balance of power has always been determined by the balance of power in Europe, and never *vice versa*.

The war and the new alliance raise the question as to the state of this inter-continental balance to-day. How much of it, if any, remains? Since 1931, western and Russian influence combined has been insufficient to deter Japan from pressing forward her invasion of China, nor to call into question her naval supremacy in the Japan, Yellow and China Seas and adjacent waters. It has barely sufficed to hold in check a process of overseas expansion which has long seemed imminent and may, with the invasion of French Indo-China, actually have begun. With England fighting for her life, France and the Low Countries under the German yoke, the United States preoccupied with the defense of an entire hemisphere and the survival of England, how much of this restraining influence remains to-day? Can it be strengthened, and, if so, how? Is the latest scene-shifting just one more in the old Far Eastern political drama, or is it the curtain-raiser to a New Order? Let us seek answers to these questions in the recent policies of the five principal Powers currently interested in the Far East: Germany, Soviet Russia, Great Britain, Japan and the United States.

The world has forgotten Germany's lost colonies in the Pacific, and Hitler, to placate his Japanese ally, has not pressed his claim to them. The Marshalls and Carolines, German Samoa, German New Guinea, Tsingtao, Kiaochow and the Shantung Peninsula were all once outposts of German empire, trade and missionary work. Germany came out of the Great War having been harried from her islands by Japan, Australia and New Zealand, pushed out of Shantung by Japan, and with her business men rounded up and deported from China by the British.

Starting from behind scratch, Germany then proceeded to build up a thriving trade with China and Japan and to rehabilitate her political influence in both countries. In China, German officers organized and trained the armies of Chiang Kai-shek. They were not recalled from that mission until the spring of 1938. Germany's political relations with Japan improved in direct ratio to the worsening of the latter's relations with the Soviets. This accounts for the fact that German neutrality was more benevolent to Japan than to China during the present Sino-Japanese conflict. After a half-hearted, or at all events unsuccessful, effort to mediate peace in 1937, Germany—already associated with Japan in the Anti-Comintern Pact—recognized Manchoukuo. Loans and barter

agreements with both Manchoukuo and Japan followed; Hitler called home the last military experts from China; and the foundation of the recent triple alliance was completed. It was so strong a foundation that Hitler evidently believed it would survive the shock of his deal with Stalin, and time has proved him right.

In addition to her commercial and political interests in China and Japan, Germany has considerable trade interests in the East Indies. This trade has consisted mostly of imports of tin, rubber, tobacco, oil and bauxite. While Germany's dependence on the East Indies for these resources is by no means as great as Japan's, it is great enough to stimulate her concern for the future of the islands. In a purely negative sense, it might be of value to Germany to deny unfriendly powers access to them, to use them for bargaining purposes. Moreover, the Australians have discovered rich gold deposits and are on the trail of oil in what was once German New Guinea. With these economic incentives, what more logical price might Germany demand for the evacuation of Holland than the return of her former colony and substantial concessions in the Dutch East Indies? For the time being, Hitler is content to use Japan as a scarecrow in that cornfield. His victory in the war would place him in a position to dictate to his ally, and the rich East Indies is a possible sphere of conflict between the two. But though Germany's economic interests in the Far East are significant, and though Hitler is advised by his official prophet of *Geopolitik*, the mystical Haushofer, not to overlook the *Raum* of the Pacific, Germany's present interests there are chiefly political and wholly subservient to her interests in Europe.

Nothing points more clearly to this conclusion than the recent Triple Alliance of the Axis partners and Japan. The timing of this *coup* indicates German rather than Japanese initiative and European rather than Far Eastern objectives. In the first place, two of the three signatories are European Powers, primarily concerned with winning a European war. It is easy to read in the terms of the alliance a warning to the United States to stay out of this war as well as the one in the Far East. Article Three pledges the signatories "to assist one another with all political, economic and military means when one of the three contracting powers is attacked by a power at present not involved in the European war or in the Chinese-Japanese conflict." It is less easy to see a similar warning to Russia. Article Five expressly states that "the aforesaid terms do not in any way affect the political status which exists at present as between each of the three contracting parties and Soviet Russia."

But consider the time scheme. Hitler's air attack on England had not produced the desired results. It was burning up German oil. For every day that the British stood up and struck back under the hammerings of the *Luftwaffe*, Axis prestige declined. Some complimentary editorials on the R.A.F. appeared in the controlled Soviet press. Autumn was approaching, a season considered less favorable for continuing the Battle of Britain and more favorable, perhaps, for beginning the Battle of the Near East. As Hitler and Mussolini planned their thrusts into Rumania and Greece they undoubtedly employed all the diplomatic means at their disposal to insure their flank against Russian attack. The tepid phrases of the Ribbentrop-Molotov Agreement were not enough; and Italy had no pact with Russia. There was no assurance that "the political status which exists at present" as between the Axis and Russia should continue to exist. What more expeditious means of achieving this end than a revival of the old Anti-Comintern Pact with real military teeth in it and a pious exemption for Russia? Under these circumstances Stalin could either be bought off with a Russo-Japanese non-aggression treaty backed by Hitler's guarantee, or fought off on two fronts if he refused the deal and intervened in the Near East. It is true that the alliance followed hard upon an American embargo of scrap steel; but it was itself immediately followed by an Axis invasion of the Balkans rather than a Japanese attack on Hongkong or the East Indies. Again the time scheme is worth noting. That the Alliance is dominated by Germany and intended by Germany for European use may be inferred even in its Far Eastern application. American assistance to Britain is one of the chief obstacles in the Axis' path, and there could be no more effective way of cutting this off than by diverting it to a conflict with Japan in the Pacific.

In short, Hitler follows a combination of the policies of Bismarck and the Kaiser. Like Bismarck, he seeks to stay on good terms with Russia. Like the Kaiser he presses hard on Russia's Near Eastern sphere of interest and overlooks no chance to encourage

(or embroil) her in the Far East. Now, as in the past, Germany draws opportunistically on her Far Eastern deposits of influence to finance more important ventures closer to home.

The same can be said of Russia. Though foreign observers have tried to make her an oriental nation, and European statecraft has sought to encourage her interest in the Far East, Russia has gazed much more intently through Peter the Great's window on the west, eyed the Bosphorus more hungrily than Tsushima, and dreamed the Pan Slav dream, not the Pan Asiatic. This has been true throughout her history, and it is true to-day. The Russo-Japanese War and Soviet activities in China have made Americans forget Russia's many wars with Sweden, Poland and Turkey, and the part she played in the Napoleonic, Crimean and First World Wars. They have made them forget the alliance with France and Soviet support of the Spanish Loyalists.

The high water mark of Russia's eastward expansion was reached when a pioneer movement not unlike the American had carried her political influence across Siberia and down through Manchuria into Korea. Since Japan rolled back these frontiers in 1905, Russia has made no serious effort to extend them again. Before the Great War she concluded no less than four secret "appeasement" treaties with her former foe. After the war, though her agents carried a short-lived ideological imperialism into China, and though in 1929 she was the first nation to defy the Kellogg Pact and make war on China in Manchuria, she withdrew before the Japanese advance to the empty spaces of Sinkiang and Outer Mongolia, and the forts and blockhouses north of the Amur. She sold out her share in the Chinese Eastern Railway. And though from 1931 to 1937 she was involved with Japan by actual count in 2,400 border disputes, many of which caused bloodshed and some severe loss of life, she chose to make none of them a *casus belli*.

This is not to say that Russia's present interest in the Far East is negligible. Since the beginning of the "China Incident" Russia has loaned China more money and rendered her more direct and effective military assistance than the rest of the Western Powers combined. Yet Russia's desire for an independent China has not prevented her from concluding a truce in the border warfare with Japan and from placing in negotiation with that nation a still more comprehensive settlement of boundaries, spheres and economic and political issues. Neither has it prevented Stalin from reaching first, through his window on the west, into Poland, Finland, the Baltic States and Bessarabia, before moving an inch from his Amur blockhouses in Eastern Asia. He has double-tracked the Trans-Siberian Railway and along the Manchurian border he has concentrated a self-sustaining army and air force which could strike Japan a heavy blow. But the offensive potential of these troops depends upon the plans which Stalin has for them, and these plans are being resolved right now, not in eastern Asia, but in Rumania, Turkey and along the Greco-Albanian frontier. It is what happens in the path of Hitler's *Drang nach Osten*, not American shipments of machine tools, which in the last analysis will determine Russia's policy in the Far East.

Great Britain's wartime relations with the Far East hinge so obviously on her success in withstanding the German air siege and preserving her sea power as to require little discussion here. But in the background of the present situation we can discern a trend in the Far Eastern policy of Britain which is often overlooked. The fact is, that British sea power has been on the decline in the Far East ever since the Great War, and perhaps longer. As Japan gained naval command of the Yellow and China Seas, Britain (and the United States too, for that matter) lost it. England recognized this fact, as was evident in her desire to renew the Anglo-Japanese Alliance in 1921. Her Pacific Dominions concurred in the wish, believing this to be the only way to protect themselves against the rising power of Japan. But all three, the mother country and Australia and New Zealand, were thwarted by Canada and the United States. The Alliance was terminated. Britain thereupon fell back on the Washington Treaties as a poor substitute for the Alliance, on Singapore as the surest bulwark of her Pacific defenses, and on the naval co-operation of France, Holland, Australia and New Zealand to re-enforce it. In addition, she hoped that the American fleet, based in the Pacific while she kept her fleet in the Atlantic, would act as a deterrent to Japanese incursions into Australasia or the East Indies. Thus, while Britain continued to share equally with Japan three-quarters of all foreign investments in China, and to endorse with the United States the

principles of the Open Door and the territorial integrity of China, her postwar policies were primarily aimed at defending India, Malaya, the East Indies and the Dominions rather than her stake or her principles in China.

Since British sea power has not for a long time been adequate, either alone or in friendly conjunction with American sea power, to command the China and the Yellow Seas, its survival in the present war is not likely to augment British influence in the Far East beyond its pre-war limits. These limits have included the defensive security of the islands and possessions already mentioned, and control of the sea routes thither. But they have not included the maintenance of the Open Door and the territorial integrity of China. This was clear in the Manchurian Crisis ten years ago. Since the beginning of the present Sino-Japanese War, British diplomacy has waged a rearguard action against the advancing Japanese, doing much to support the Chinese currency, suffering the indignities of the Tientsin blockade and the virtual blockade of Hongkong, clinging doggedly to the old *Points d'appui* in China and, most recently, reopening the Burma Road. But there is no talk in London of restoring British influence in the Far East to its nineteenth-century peak, when Lord Salisbury took Weihaiwei as "cartographical consolation" for the Russian seizure of Port Arthur. There is no hope of forcing Japan to abandon her campaign in China. There is only a desperate effort to prevent that campaign from sweeping down along the Chinese littoral until it cuts off Singapore from the rear. The Japanese are already based in Indo-China, less than 700 miles from Singapore by sea. They are speaking loudly in the councils of Thailand. Let them cow Thailand, or bribe her into submission, and not only will they have cut off Singapore by land, but they will have placed themselves virtually on the shores of the Indian Ocean and the edge of the Burma Road. It is only 300 air miles from Bangkok to Rangoon, the port that feeds the Burma Road, and the road already is under Japanese bombardment at other points. The reopening of the Burma Road may slow the Japanese momentum; it can stop it only if Britain survives to keep the road open.

Meantime, all roads lead to London, even those of the Dominions most in jeopardy from Japan. Australia and New Zealand have a combined population of less than nine million, and though they are responsible for contributing to the active defense of Singapore they are concentrating on the training of fliers and troops for service in England and the Near East. They are likewise building up their territorial defenses. But their primary concern is that England, and the British Navy, come through their present ordeal. And even the restoration of British influence in the Far East on an *ante bellum* scale promises them such a precarious security that they are turning, hopefully, to the United States. The last diplomatic scene-shifting in the Far East, Japan's alliance with the Axis, has had little effect upon these basic, long-term trends of British policy.

Japan has the advantage of all the Powers under discussion in that her interests in the Far East, unlike theirs, are direct and primary. We are not concerned here, however, with a minute analysis of these interests but with Japan's position in the changing balance of world power. Her fundamental goal to-day differs little from her goal during the First World War. Nor are her policies very different. She is ready, quite free from moral or ideological scruples, to associate herself with the winning side in the war in Europe. If she succeeds in doing this she will have a reserved seat at the Peace Conference, a chance to pick up crumbs from the tables of the mighty. Her alliance with the Axis means that she has bet on the Axis to win. Or, if we accept the thesis that the Triple Alliance sprang from German initiative, she has bought a premium from the high-pressure Nazi insurance salesman. In either case, it is hard to see how Japan can contribute directly to an Axis victory in Europe, e.g., by dispatching thither her troops, planes, warships or munitions. She did not do this in the First World War. With the "China Incident" still on her hands, she is even less free to do so now. Nor does the Axis need or expect that kind of help.

As already indicated, Japan can make her contribution to an Axis victory in indirect ways. She could embroil the United States in the Pacific, and that would divert American energies from assistance to England. She can help Hitler kill Stalin with kindness. Whether or not the Russian dictator acquiesces by treaty in the New Order in both the Near East and the Far East, the military potential of the "natural" German-Japanese alignment *vis-à-vis*

Russia continues to exist. That Stalin understands this would be proved rather than confuted by his adherence to the Triple Alliance. No doubt Japanese diplomats have been telling their Soviet colleagues that the Alliance is intended against the United States and their American colleagues that it is intended against Russia. Both of the statements are true, especially the second.

Japan does not need to fight either America or the Soviet in order to make some minor, though by no means insignificant, contributions to her allies. Merely by threatening the Dutch East Indies, Malaya, Singapore, the Philippines, Australia and New Zealand, she anchors the American Navy in the Pacific, and draws to the Philippines American bombers that might otherwise be doing service over Germany. A Japanese invasion of the Dutch East Indies alone would not strike either Britain or the United States a mortal blow. In the first place, it would be no easy task for Japan to dominate a land area of 734,000 square miles, extending, 3,200 miles from west to east on both sides of the equator. Here is a theater of war in which the Dutch, British and Dominion naval and air defenses, though small, could harass the invader indefinitely. Secondly, Japan could not cripple the British nor prevent an American war effort by stopping the flow of oil and rubber from the Dutch East Indies. Both nations have abundant alternate sources of oil. Their dependence on East Indian rubber sources is greater, the United States obtaining upwards of 25 per cent of its rubber imports from these islands. But both England and the United States are far more dependent for this commodity on the Malay States (from which the United States draws nearly 70 per cent of its supply), a region under perhaps greater danger from Japan than the more conspicuous East Indies.

Should Japan occupy both territories, or put herself in position to control the sea routes to and from them, Britain and the United States could still get rubber from Ceylon, their third largest source, and sustain themselves on reserves, substitutes and reclaimed stocks. But the practice would be expensive and hence would constitute a Japanese tax levied on Britain's defense against Hitler and on American assistance to Britain in that task. It is possible, moreover, that Germany and Japan could exploit this rubber hoard either by bartering it between themselves and their allies or by selling it at monopoly prices to their enemies. The mere possibility has already given a powerful stimulus to the American development of rubber plantations in South America and of substitutes at home. Neither of these sources could supply the normal, non-emergency, industrial needs of the United States, at costs to which the American market is adjusted. A seven-year period is required for a rubber tree to mature and begin to yield. Satisfactory substitutes might conceivably be produced more quickly, at as reasonable costs and in as adequate volume as the Malaysian plantations or their prospective successors in South America. Meantime, the capacity of Japan or Germany to use rubber as an economic weapon against both England and the United States depends upon the British Navy's control of the Atlantic and Indian sea-lanes to Singapore; and this in turn rests on the girders of the political house-that-Jack-built, the foundations of which are under German air bombardment.

If it is true that Japan will make no direct contributions to the Axis cause in Europe, it is also true that Germany and Italy will make no direct contribution to Japan in her war on China. The Russo-Japanese relationship works both ways. Hitler can aid Japan indirectly by merely continuing to do what he is already doing in the Balkans. He can hobble Stalin with non-aggression pacts or admit him to partnership in the New Order. He might even compel Stalin to abandon his support of Chiang Kai-shek and dictate a Sino-Japanese peace which would free Japan for an outright assault on the British Empire. The idea has certainly crossed his mind. The more his prestige feeds on success in Europe, the easier it will be of execution. Moreover, by keeping his armadas in the air over England, he attracts in that direction American resources which otherwise might be employed against Japan. But unless and until he breaks the British blockade, the R.A.F., and the morale that sustains them both, he can inflict no serious injury on the United States. So long as Britain survives, the American fleet can remain at Pearl Harbor, the one last western counter in the Pacific scales of power.

As we trace out these various lines of European and Far Eastern policy we see one compelling implication for the United States. For more than half a century the Far East has been America's

backdoor to Europe. To-day Europe has become America's frontdoor to the Far East. This is not something that ought to be or ought not to be. It is what is. The pragmatic decision of the American Government has been made to concentrate whatever energies and resources it can spare from its own defense program on assisting England to withstand the German siege. This does not mean that the United States has turned its back on the Far East. Far from it. It does mean that no major decision of Far Eastern policy is taken in Washington without a preliminary appraisal of its costs or benefits to the British war effort.

How much latitude this rule of thumb permits for American diplomatic action in the Far East is a question compounded of many elements: the relative effectiveness of the Chinese and Japanese armies in their present theater of war; the relative naval and air strength that the British, Dutch, Australians and New Zealanders could muster against the Japanese in East Indian waters; the 2,920 miles from Yokohama to Singapore and the 6,107 miles from Singapore to Pearl Harbor; the relative indispensability of East Indian and Malayan rubber to the United States and of American cotton, iron, steel, oil and tools to Japan. But these are as chips on the gaming table in comparison to the basic will of the American people regarding the rôle they intend to play in world politics. There is no doubt at all as to what rôle they would like to play. If all they had to do was to pull a lever, they would immediately bring peace and justice to both Europe and the Far East, which, practically speaking, would mean a free and independent England, France and China, the demobilization of the Axis legions and a universal restitution of human, i.e., civil liberties. How far they are prepared to go to accomplish this end in the difficult byways of world politics outside their own hemisphere is another matter. Nor has it been settled beyond the lines already indicated by the unprecedented third election of President Roosevelt.

Since the First World War, Americans have tried to banish from their minds the belief that war was an unavoidable or even a necessary part of civilization. They have listened eagerly to the prophets of peace, disarmament, international co-operation. They have clutched at the hope that their great economic wealth and sincerely peaceful intentions could in some way influence the outer world to share their views. One by one they have watched these ideals, beliefs and hopes go a-glimmering. To-day, for the first time in their history, they have adopted peacetime conscription

and appropriated the money for the greatest navy and air force on earth. Thinking of France, they have come with regret to adopt the prudent counsel of Machiavelli, who wrote:

Every one may begin a war at his pleasure, but cannot so finish it. A prince, therefore, before engaging in any enterprise should well measure his strength, and govern himself accordingly; and he must be very careful not to deceive himself in the estimate of his strength, which he will assuredly do if he measures it by his money, or by the situation of his country, or the good disposition of his people, unless he has at the same time an armed force of his own. For although the above things will increase his strength, yet they will not give it to him, and of themselves are nothing, and will be of no use without a devoted army. Neither abundance of money nor natural strength of the country will suffice, nor will the loyalty and good will of his subjects endure, for these cannot remain faithful to a prince who is incapable of defending them. Neither mountains nor lakes nor inaccessible places will present any difficulties to an enemy where there is lack of brave defenders. And money alone, so far from being a means of defense, will only render a prince the more liable to being plundered. There cannot, therefore, be a more erroneous opinion than that money is the sinews of war.

Until the United States has built its new army, navy and air force, this sense of prudence will probably continue to direct its major attention—apart from that devoted to its own defense program—to the defense of the British Isles. This will not preclude maintaining, and perhaps even strengthening, the moral and legal embargoes on the export of certain strategic war materials to Japan. Neither will it preclude Export-Import Bank credits and the continued sale of war materials to China, the concentration of bombers and submarines at Manila, the continuous mobilization of the fleet at Pearl Harbor, political arrangements for the use of British and Dominion bases in the Pacific, and opportune conversations with the Soviet Ambassador. Add all these probabilities to the Far Eastern capacities and propensities of the other Powers already itemized, and how much do they weigh? Enough to force Japan to evacuate China? Hardly. Enough to prevent Japan from sapping Britain's capacity to resist Germany from the rear? Perhaps. Enough to ensure the security of the Philippines? Probably. To bring the Far Eastern scales of power into balance? No. That can only be done in Europe.

New Portents in Asia

By C. J. LAVAL

THE chances for peace in the Pacific remain uncertain. Increased hardship and ever harsher living conditions for populations in Far Eastern countries, both native and alien, appear to be probable. Again is to be recorded that the destiny of peoples in lands bathed by the waters of the western Pacific hangs upon the outcome of the great conflict in Europe. The whole world is in process of tightening its belt to meet a looming ordeal the consequences of which must bear heavily in the future on generations still unborn.

The American democratic way of life, for maintenance of which the United States at length has entered the lists in the world conflict, may by this action itself have been brought to a turning point to usher in for the American Nation a new glorious era under a concept of world-wide scope eminently more practical than was the ideal of Woodrow Wilson to rule the world by moral suasion. The generals and the armies in many lands of both Hemispheres continue to fight on an ever-expanding scale, quite possibly for the ultimate triumph of the Moscovite objective and for the greater glory of Josef Stalin.

Tension in the Pacific lately has relaxed and the likelihood of conflict between Japan and the United States has lessened. Even faint murmurings have begun to appear in the news despatches indicating that Japan may seek to find cause to withdraw from the alliance she so lately entered into with the European Axis Powers. The whole Far East is awaiting with no little anxiety results that

may follow upon the visit to Moscow, Berlin and Rome of the Japanese Foreign Minister, Yosuke Matsuoka.

Although Great Britain and the United States necessarily have taken Japan's New Treaty with Germany and Italy at face value as the document was published, enough time to gain a clearer perspective has elapsed, and significant official and semi-official statements regarding the Treaty reveal clearly that, in concluding the agreement, Japanese statecraft was not so remiss or so short-sighted as to leave in Hitler's hands the power of initiative for starting war in the Pacific, as might have been inferred from the bare text of the Treaty as published.

Significant Factors

Japanese official assertions that "consultation" between the signatories of the Three-Power Treaty must be an essential preliminary to Japanese involvement in the war makes it clear that the terms of the Treaty carry specific stipulations. It is to be deduced from this that one or more escape clauses that have not been made public impose limits on the Treaty terms, define exactly conditions under which they shall become effective, and quite possibly, remove the stinger from Article Three of the Pact, which, among other things, provides that the three signatories agree "to assist one another with military means when one of the three contracting powers is attacked by a Power at present not involved in the European war or the Sino-Japanese Conflict."

In international political exchanges diplomats are not wont to yield something for nothing. It seems apparent that while Japan was in a position to be helpful to the European Axis Powers by harassing and menacing Britain's Far Eastern possessions, values that Germany and Italy were in a position to give in return for such help are more or less obscure. It was not to be expected that Japan would do more than feint cautiously in the Western Pacific, as has been happening, and would refrain from launching any major adventure so long as the Russian menace on her rear flank remains. In negotiating the Three Power Treaty Japan may have been led to accept German assurances that, under pressure from Berlin, Stalin would make a non-aggression pact with Tokyo. Japan also desires to hasten the conclusion of the conflict in China, and as a means to this end she would deem it helpful if Russia could be induced to cease sending munitions and other aid to the Chungking Government. Since Germany and Italy were not in a position to be helpful to Japan in any other way, it seems logical to assume that, in negotiating the Treaty, Japan would insist on the only thing the Axis Powers could grant and would require, and make as a condition of the Treaty terms, that the Axis influence be exerted at Moscow to remove by means of a non-aggression pact danger of any unexpected Russian attack across the borders of Manchoukuo and Korea. The cessation of Russian aid to the Chungking Government would be an additional requirement along with lesser things, such as recognition of the Wang Ching-wei Government at Nanking.

Why Matsuoka Went Travelling

A half year has elapsed since Japan has signed the Treaty with the Axis Powers. The Nazi onslaught against the United Kingdom continues to be an onslaught, not a triumphant victory. Mussolini's legions have been ignominiously defeated and hurled back deeply into the mountains of Albania by Greek and British forces. The Italian Empire in North Africa has crumbled under the blows of advancing victorious British troops. The United States virtually has entered the war and has pledged all-out aid for Great Britain. The Red Sphinx at Moscow remains observant and silent twiddling his thumbs, but he has not authorized the signing of any non-aggression treaty with Japan, and by all accounts the caravans of Russian supplies to the Chungking Government continue to arrive on schedule, while conditions in China indicate all too clearly that Russian communist influence is in the ascendant over the vast areas of the land.

The gaps and omissions in the course of events that have unfolded since Japan signed the Treaty with the Axis Powers furnish ample cause why the Japanese Foreign Minister should desire to converse with Messrs. Hitler, Mussolini and Stalin. If Germany and Italy are powerless to fulfil conditions pertaining to the Three Power Treaty, as seemingly they are powerless, then it follows that the way is left open for Japan to retire gracefully from her commitments under the Treaty. In this connection may be mentioned recent rumours that Mr. Matsuoka after his visit to Europe may proceed to London.

In all of this may be found some basis for the assurance lately given in London by Ambassador Shigemitsu to the British Government that Japan harbors no intentions to attack British possessions "in any part of the world." This notification by the Japanese Ambassador followed an outburst of dire prophecies of imminent dangers made by British officials in Australia and Singapore with the landing of Australian troops at Singapore from a transport that hastily has been diverted to that port.

In her own sphere in the Far East, Japan, in recent times, has scored an outstanding diplomatic success through mediating to terminate the border dispute between Thai and Indo-China. In the Agreement that was reached at Tokyo ending this conflict the Thai Government recovered vast territories she had lost to Indo-China in the preceding century, and thus, in a measure, may have been recompensed for the forbearance her delegates displayed at Geneva nine years ago when Japan was a defendant before the bar of the Council of the League of Nations.

Japan's relations with Siam consistently during past decades have been more cordial than with any other Asiatic people. It is to be expected that this accord will be strengthened further as an outcome of the Japanese mediation in the recent warfare. Though denuded in the past of many of her possessions Siam, now Thai, succeeded in maintaining her independence as a Power. With respect to the bogeys lately raised about a possible Japanese attack

on Singapore, it is to be observed that if Japan had any idea of undermining the British position in the Far East, conditions make it unlikely that she would hazard lives and treasure on any attack against the Singapore Base which is held to be impregnable. It would appear much more likely, holding the favorable position she does with the Government at Thai that Japan might arrange events in such fashion that the Thai Government would be enabled to free itself of the British influence and tutelage implicit in existing financial interrelations, and then to undertake with Japanese assistance the building of a canal across the narrow Kra Peninsula. This project, which repeatedly has been discussed in the past, from an engineering standpoint would be a vastly easier job than was the building of the Panama Canal. If a Kra Canal should be built, Singapore would be isolated, sailing time between Europe and Far Eastern waters would be shortened by a day and a half at least, and the big guns of the Singapore fortifications possessing a range of 25 miles would be left nothing to shoot at.

The China War Goes On

While tension on the broader stage in the Pacific has relaxed measurably hopes for a return to peace of war weary China have evaporated in the heat of a new internal conflict that recently increased in intensity after announcements were published of huge new credits from Washington and London to the Chungking Government. After nearly four years of destructive warfare with Japan, the head of the Chungking Government finds himself betrayed and menaced by Chinese armies whose loyalty should be unquestioned. This development follows precisely traditional trends of Chinese warfare. In all the scores of wars that have been fought in China since the overthrow of the Manchus disaffection and treachery unfailingly have appeared on one side or the other. In just the same way that Sun Yat-sen was betrayed twenty years ago by his right hand man, Chen Chung-ming, Chiang Kai-shek is being betrayed to-day by generals and communist armies over which his control should be absolute.

The marriage of Communism and the Kuomintang, which antedated by only a few months the outbreak in 1937 of the conflict with Japan, was a misalliance from the beginning, although it is to be admitted that this union was none of Chiang Kai-shek's seeking, but was thrust upon him when he was kidnapped in 1936 by Chang Hsueh-liang under Communist inspiration. Thus, involuntarily, Chiang Kai-shek was thrust into the same error that Sun Yat-sen had committed many years earlier when the great leader first introduced Communism into China by seeking and accepting Russian help, believing that China had nothing to fear from Communism.

Sun Yat-sen lived to see the Communist influence spread in China to an ascendancy that led to eight years of bitter internecine warfare that cost millions of Chinese lives. Within the first year of the conflict with Japan Chiang Kai-shek learned that his Government had to give ear to orders from Moscow when he and his counsellors, about to accept a proposal put forward by the German Ambassador to open peace talks with Japan, were forbidden to do this by veto of Stalin.

Through the years of bitter conflict that have followed this episode, in which China has lost her seaboard and all the vast area now occupied by Japanese forces, the Communist armies and their leaders, subject primarily from orders of Moscow, consistently have been recalcitrant, finding in the war of resistance to the Japanese with its so-called 'united front' the ideal means to serve purely Russian Communist ends by extending Communist influence with the obvious purpose ultimately to rule China. This is an internal conflict separate and apart from the warfare with Japan and in recent times it has attained such proportions that conflicting Chinese armies have been engaged in warfare on a large scale in four provinces.

Chiang Kai-shek States Case

No clearer picture of all this can be presented than that contained in the report recently presented by Generalissimo Chiang Kai-shek as Head of the Chungking Government before the National People's Political Council. The text of this Report was published early in March in Chungking newspapers. Communist delegates to the Political Council headed by General Mao Tse-tung and Wang Ming refused to participate unless specific demands were granted.

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A Foreign Minister's Shopping Tour

By WILLIAM HOSOKAWA

A ONE-TIME American schoolboy started on a shopping tour this month, a journey that commands the world's interest. Yosuke Matsuoka has come a long way since his days at the University of Oregon, and he is shopping for concrete assurances of his nation's future. For Japan's Foreign Minister knows well the plight that his country is in.

Ostensibly, there is nothing world-shaking about the mission that takes Mr. Matsuoka and his party almost half way around the world into the middle of warring Europe. Mr. Matsuoka himself claims he has no special mission, he simply wished to speak leisurely, frankly and exhaustively with German and Italian leaders whom he has never met. Tokyo states officially that the trip had been planned at the time the Tri-Partite Pact was signed last September.

But the world suspects that something more than routine business is behind this move, especially since it is the first time since the Russo-Japanese War that a Tokyo Foreign Minister has gone abroad on a diplomatic mission. Speculation, as usual, has been rife. Rome and Berlin have trumpeted the significance of the visit (Matsuoka said there wasn't any special significance), London watched quietly while joining in the speculation, and many Americans began to question at last the wisdom of their Far Eastern policy even as President Roosevelt promised more and still more material aid to the democracies, including China. But they all watched Matsuoka, the man who was shopping for a future.

For many months after the Far Eastern hostilities began in July, 1937, it was merely a localized war, affecting only in a limited way the economic interests and political balance of the rest of the world. All that is changed now. Japan's adherence to the Axis, and the willingness of Britain and America to overlook China's political deficiencies and welcome her into the anti-Axis camp as a democracy have all but made two different wars separate fronts of a single war.

What it Means to Japan

It is pointless here to labor the question of whether Japan was driven into the Axis by Anglo-American opposition to her program in Asia, or Japanese adherence to the Axis, was the last straw in causing the United States to embark on an all-out assistance policy regardless of the possibility of war. Probably there can be no clear-cut answer, for issued go far deeper than these immediate factors, and many other outside considerations must be included. All that matters is that President Roosevelt has interpreted his powers under the newly approved Lend-Lease Bill to extend to a virtual declaration of war on the Axis in Europe and Asia, notwithstanding the published statement that Japan's part in the Tri-Partite Pact becomes effective only on the condition that the United States attacks another Axis member.

This latest American act, which has caused editors in the United States to declare without further qualification: "We are at war," has made it evident to Japan that she can expect opposition to her program no matter what progress she can make toward peace in China, just so long as the Chungking government continues to ask for American aid. If the United States has underwritten total victory for Great Britain, Japan cannot expect that America will leave the Far Eastern difficulties hanging inasmuch as China has been accorded a place among the democracies.

President Roosevelt in reply to a newspaperman's query made it clear that American aid will be given Chungking, no matter against whom. The question was asked in reference to the Kuomintang-Communist split, but the manner of the reply makes it possible to assume that America will oppose even a spontaneous, widespread peace move and rebellion against the Chiang-Soong-Kuomintang oligarchy. While such an uprising may appear remote at present, the bonds of political alliance are more tenuous in China than in many another nation, and the close suppression of popular unrest makes possible a sudden, unexpected flareup.

No one could have studied these implications of American policy more closely than the Japanese Foreign Minister, for his is a heavy stake. To counteract Anglo-American pressure against

Japan's China program, he joined the Axis. It was apparently not an all-binding agreement, and was conceived more for show and psychological effect than practical operation. The American reply was an unmistakable defiance.

America's campaign of extending her influence throughout the world has brought into sharp relief the one-sided nature of the Tri-Partite Agreement. Japan would be of great assistance to Germany if she harried the Far Eastern borders of the British Empire and eventually kept the American navy and a goodly portion of her national energy tied up in a Pacific war. But, Japan asked, of what use would Germany and Italy be to her, economically militarily, or financially, if such a war did take place? None, apparently, not even influence with Russia to get her assurances of benevolent non-aggression for her northern mainland flank if she became engaged in the south and the Pacific.

Storm Signals Flying

The vast American armament plan is proof enough that Uncle Sam means business. A giant fleet of naval and auxiliary ships, designed for offensive rather than defensive duties, is rapidly taking form through construction, purchase and alteration. Some American leaders are talking of steaming right into Japanese waters in terms more belligerent than those of Japan's habitual sabre-rattlers. Appropriations have been provided to fit out Guam as a base, and that strategic little island in the middle of the Japanese Mandate happens to be twice as far from Honolulu as it is from Yokohama, and more than 5,000 miles from San Francisco. And far out on the Aleutian Islands, just a short air hop from Japanese territory, more American bases are being put up.

All this action is being taken by the United States in the name of defence, but Mr. Matsuoka knows as well as anyone in Washington that it is a physical impossibility for Japan to invade the American side of the Pacific even if such strategy fitted into Japanese plans. He knows that any American-Japanese war will be a naval and air war, fought in Far Eastern waters close to Japanese shores with the American fleet basing at Singapore, Manila, and Australian and Netherlands Indies stations. The Japanese can see, if the American people do not fully realize, that outposts for defence can also be used as stepping stones for offense.

For Japan's practical purposes it does not matter that President Roosevelt's actions are several months ahead of public opinion. It took almost that much time for the Lend-Lease Bill to clear Congressional opposition. The immediate action that the President took to implement the Bill when it was approved, and the fighting war speech that followed, no doubt left a great many Americans dazed at the speed and bewildered with the thought that they really hadn't meant approval for such determined measures. Undoubtedly it will take a few weeks for American opinion to get to the point that Roosevelt reached in that memorable address at the White House Correspondents dinner on March 15.

That, however, is almost beside the point for Japan, for opposition to the Administration's program is ineffective if bitter. Instead of opposition on basic grounds, the effective portions of it are confined to small details. President Roosevelt has proven time and again that he is in the driver's seat, and as he directs the nation will follow.

As a fundamental principle of nations as among men, each seeks to better and to safeguard itself with no great eleemosynary sentiments. No matter how eloquently Hitler may speak, Matsuoka and the rest of the Japanese cannot be convinced that Germany must be given total assistance at the risk of Japan's welfare. If Japan aids the Nazis, it is because Japan's best interests are served simultaneously. Otherwise there is no sense in expending her wealth and manpower and jeopardizing her position.

This is a fundamental of international affairs that is constant and which no amount of spell-binding oratory can fully obliterate. It is this principle that leads Mr. Matsuoka to Europe, for he is not convinced that more active Germano-Japanese collaboration is profitable. He wants to investigate before committing himself

further. He is shopping about, and if the Axis, to which he is not irrevocably bound, cannot offer what he needs, he is not going to buy.

Depends on Hitler

It is apparent now that Japan's present Axis commitment is merely defensive as Tokyo has maintained all along. Whether it will go further depends on what Hitler has in the way of guarantees for Japan's future. On the other side of the picture, Hitler can ask Matsuoka point blank what he hopes to gain by repudiating the Axis.

At one stage of American-Japanese relations, about the time Admiral Nomura reached Washington as Japanese Ambassador, it was declared that complete severance of Japan's Axis ties must be preliminary to readjustment of the Pacific situation. Now, it is a question whether such a step would be appeasement enough for Washington. Possibly the United States would demand Japanese withdrawal from China, which of course, the Japanese would not consider without specific guarantees that her gains would be respected. America would probably welcome a chance to mediate the Sino-Japanese hostilities if the opportunity came, for here would be an unparalleled opportunity to demonstrate her plans for the peaceful new world order. Japan, however, must undergo a great change before American mediation would be welcomed because of the United States' obvious one-sided sympathies.

Any withdrawal for Japan without due recognition of her military successes would practically mean Japan's abdication as a major power. Those who know Japan realize that the Japanese would go down fighting a hopeless war rather than voluntarily give up claim to East Asiatic leadership.

Matsuoka must realize that after Germany is taken care of the United States will ultimately carry her crusade into the Orient. Not least among the objects of this trip will be to determine whether Germany is in fact going to be put out of the way by what now appears to be the invincible tide of Anglo-American power. After the German collapse, which looms greater as a probability than ever before, Japan would be in no position to resist all-out Anglo-American opposition alone, especially since Soviet Russia would have no scruples about back-stabbing.

How to get out of this dilemma is Mr. Matsuoka's own particular problem so long as he remains in the Foreign Ministry. Repudiation of the Axis is simple enough, provided there is promise of something better with the Anglo-American bloc. But this too is problematical since the United States and to a lesser degree Britain have persistently thrown obstructions into Japan's path.

Claiming no oracular powers, the author has no idea how a peaceful solution, if any, is to be brought about. All studied observers of Far Eastern problems are agreed that a Japanese-American war would be futile and decisive of nothing, and therefore to be shunned as a costly tragedy. They are equally agreed that no issues exist which require war for settlement, and diplomatic channels are still open. With the new tone that the United States has adopted, however, it begins to look as if possible bases for agreement are becoming narrower and narrower.

While at first glance American policy is irrevocably opposed to Japan's plans, this is not an accurate picture. When Japan ceases to be regarded as a threat to American safety and world order, the two countries, theoretically, cease to be at loggerheads.

New Definitions for Democracy

With all due respect for democracy, a highly advanced and admirable political and social system which the United States avowedly seeks to safeguard, American policy stripped of its fine words reveals deep down that familiar old natural law, self preservation. In Europe it happens that non-democratic countries besiege Britain, a democratic nation. In plain language without the frills, Britain is primarily a stalwart buffer between the United States and potential enemies, and only incidentally a stronghold of democracy.

The word democracy sounds as fine in oratory as the democratic principle operates well in American practice. Thus the word was used loosely as a cover-all for all nations unfriendly toward the Axis and friendly toward the United States. Underneath that blanket term which American leaders spread so liberally, there are strange bedfellows—dictatorships as in Greece, an oligarchy as in China, democracies of form but not of practice, as among America's southern Spanish-speaking neighbors.

More recently President Roosevelt corrected his terminological inaccuracy when he began to refer to "democracies and anti-Axis powers." Secretary of State Cordell Hull backed up his chief when in explaining the use of powers under the Lend-Lease Bill he declared in part: "Our assistance would be contemplated for any country that is carrying forward a movement of resistance against the three invading forces which under the tripartite agreement are rather closely interrelated countries. Our assistance would be to countries whose defence would be essential to ours as was stated here."

This was frank admission that America's determined action is primarily for her own defence, and not merely for defence of a political system as might be inferred from other American statements. The United States is opposed to certain nations, not because of their political philosophies, but because they menace her welfare. They should cease to merit that opposition when they are no longer a potential danger.

While all this may sound like crass rationalization, it makes sound sense to individuals who had enough 25 years ago of going out to make the world safe for democracy. Plain speaking helps restore the proper perspective.

Thus on the day that Japan ceases to menace the United States and the peaceful world order that America champions, there will be a new Japanese-American relationship. Study shows that Japan's intentions for her New Order coincide closely with the conditions that America lays down as necessary to gain her approval. The fine plans that Japan had to begin with have obviously misfired, and as the going became harder, the extremists gained greater voice in Japanese counsels. The liberals and the moderates lately have had little encouragement.

Chiang's Viewpoint

In Chungking Generalissimo Chiang Kai-shek told interviewers that if the United States gives China immediate aid, China's armies would launch a counter-offensive which would relieve international tension in the Pacific and might even lead to a quicker peace in Europe. He has also been quoted as saying that if the United States would aid China half of the extent she was aiding Britain there would be no danger of the United States herself being involved in a war in the Far East.

It might be said with equal weight that if the United States halted all aid to China, there would be even less danger of the United States herself being embroiled in a Far Eastern war. Many competent observers know that had the United States given Japan just a small part of the friendship, understanding, sympathy, guidance and assistance that has been showered on China, Japanese policy would not have veered away from Britain and America.

To the contrary, lack of foresight resulted in the Japanese Yellow Peril being exploited frequently when the United States needed some outside threat, actual or imagined, to influence opinion on some purely internal affair. More lately, as the danger to the United States from the Atlantic side became menacing, the emphasis has been taken off the threat from the Pacific. To many an American observer the repetition of the Yellow Peril story has given it a hollow ring. The latest efforts to emphasize this Pacific danger, by pointing out not a potential invasion, but the rubber-tin-quinine lifeline to Malayasia and the Netherlands Indies, has had doubtful reception because this possible source of trouble is so insignificant to the more immediate threat of Nazi victory in Europe.

One section of American opinion is reflected in a suggestion put forth recently by the outspoken American radio and newspaper commentator, Boake Carter. He declares it would be an ideal if not practical solution to the Pacific problem for the United States to "ally itself commercially, if not diplomatically, with Japan in any order: (1) to offset the Russians (2) jointly control the Far East for business purposes (3) establish the most powerful union of two nations anywhere on the globe (4) with the co-operation of Japan on our Pacific flank, the U.S. Fleet could be placed in the Atlantic and the American taxpayers would not have to pay an exorbitant price for a tax-eating two-ocean navy."

Of all these reasons, the last would appear to hold the most appeal now, for as one prominent Congressman pointed out, the United States could get her two-ocean navy in a couple of hours by signing up with the Japanese instead of opposing them.

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The Central China Development Company

By DAVID S. SMITH

ALTHOUGH little information is available, the fragmentary reports of the Japanese press indicate clearly that the business condition of the Central China Development Company has been greatly improved in 1940. In the following details of the business condition as well as the business profit of the Central China Development Company and its many subsidiary companies are summarized from reports that have been published.

The Parent Company

The Central China Development Company was established on November 7, 1938 with a capital of Y100,000,000. It was divided into 2,000,000 shares of Y50 each and the total paid up capital was reported to be Y31,382,344. In 1939 the interest on the shares was 4.5 per cent but in 1940 because of improved business conditions, the interest paid was 6 per cent.

In 1940, the Central China Development Company invested in its many subsidiary companies a total capital of Y51,140,000, representing an increase of Y17,200,000 when compared with 1939. By the end of 1939, investments in these companies was Y33,930,000.

The following table gives the amount of capital invested by the Central China Development Company in its many subsidiary companies:—

	Investments End of 1939	Investments End of 1940
	(in Yen 1,000)	
Central China Mining Company ..	3,400	3,400
Hweinan Coal Mining Company ..	1,030	2,070
Central China Salt Company ..	500	500
Central China Electricity and Water Works Company ..	3,770	5,900
Central China Tele-Communication Com- pany ..	3,000	6,000
Shanghai Inland Water Navigation Com- pany ..	300	450
Central China Railway Company ..	15,090	22,900
Central China Bus Company ..	740	1,110
Chung Hwa (China) Shipping Company ..	—	2,730
Greater Shanghai Gas Company ..	450	450
Shanghai Real Estate Company ..	2,500	2,500
Central China Marine Products Company ..	1,380	1,380
Central China Silk Company ..	1,000	1,000
Central China Housing Company ..	750	750
Total ..	33,910	51,140

Central China Salt Company

The Central China Salt Company was first established on August 21, 1939 with a capital of Y5,000,000 divided into 100,000 shares of Y50 each. The paid up capital was Y1,250,000. The company sustained heavy losses in 1939 as some of its important salt fields were washed out by high water. The deficit in the year was reported to be Y47,669. From November 1, 1939 to October 31, 1940, business condition of the company improved and no less than 179,854 tons of salt were supplied to different companies and provinces, which was only 60,000 tons less than the amount which the Japanese authorities expected to be turned out during the year. The following table gives the amount of salt which the company supplied in the year:—

	Quantity Expected by Japanese authorities	Quantity Actually Supplied
	Tons	Tons
Tung Yuan Salt Company ..	95,500	81,937
Honan Province ..	5,000	2,563
Hankow area ..	50,000	41,577
Chinese Industrial Houses ..	5,000	628
Kiangsu Province ..	30,000	10,330
Yangtze Valley ..	10,000	31,629
Reserve ..	10,000	3,590
Others, including exports to Japan and military use ..	30,000	7,600
	245,000	179,854

In 1940, the Central China Salt Company made a profit of Y532,030. Deducting the loss of Y47,669 of the previous year, the net profit of the company was Y484,360 as shown in the following table:—

Net Profit ..	Y484,360
Reserve ..	100,000
Special reserve ..	50,000
Pension to staff members ..	50,000
Bonus to staff members ..	26,000
Interest on shares at eight per cent ..	100,000
Carried over to 1941 ..	158,360

Central China Mining Company

The Central China Mining Company was established in April, 1938 with a capital of Y20,000,000 fully paid. The capital was divided into 400,000 shares of Y50 each. The company operates the mines at Ma-an-shan, Feng-huang-shan and Tung-kwan-shan and is doing much prospecting work also. In May, 1940, the company spend Y300,000 to organize a special laboratory in the suburbs of Shanghai to analyse the contents of mineral ores.

From November 1, 1939 to October 31, 1940, the company made a profit of Y1,282,225. The special shares (paid in cash) will receive interest of eight per cent while the ordinary shares (paid in kind) will receive interest of two per cent as shown in the following table:—

Net profit ..	Y1,282,225.43
Carried over from 1939 ..	34,147.91
Total ..	Y1,316,373.34
Reserve ..	Y 130,000.00
Special reserve ..	50,000.00
Pension to staff members ..	30,000.00
Bonus to staff members ..	60,000.00
Interest to shareholders ..	1,008,654.92
(special shares at eight per cent Y573,224)	
(ordinary shares at two per cent Y121,220.00)	
Carried over to 1941 ..	37,718.42

Under the new program of economic development in Central China, adopted by the Japanese authorities in the early part of 1941, special attention will be paid to this particular subsidiary company in the future. More capital will be invested by the Central China Development Company to develop mines.

Hweinan Coal Mining Company

The Hweinan Coal Mining Company was established on June 15, 1939 with a capital of Y15,000,000, divided into 300,000 shares of Y50 each. The paid-up capital of the company was only Y9,676,000. In the early days of its operation, the company turned out around 1,000 tons of coal every month. Since last May, the monthly production was considerably increased because of the adoption of the Five-Year Production Plan of the company. From October 1, 1939 to September 30, 1940, the company made large profits. For the second half of the year from April 1, 1940 to September 30, 1940, the company made a profit of Y345,753 as shown in the following table:

Net Profit (April 1—September 30, 1940) ..	Y345,753.00
Carried over from (October 1, 1939—March 31, 1940) ..	113,000.00
Total ..	Y458,753.00
Reserve ..	35,000.00
Pension to staff members ..	35,000.00
Bonus to staff members ..	15,000.00
Interest to Shareholders at six per cent ..	290,250.00
Carried over to 1941 ..	83,500.00

Electricity and Waterworks Company

The Central China Electricity and Water Works Company was organized in June, 1938 with an authorized capital of Y25,000,000, divided into 500,000 shares of Y50 each. The actual paid-up

capital was Y20,000,000. In the early stage of its operation the company lost money and it was only in the period from May 1, 1940 to October 31, 1940, that the company showed any amount of profit. As light and water are public utilities, the Japanese authorities will not pay any more attention to their development in the future and the Central China Development Company is not expected to invest more capital in this company. The profit of the company in the latter part of 1940 was Y1,199,370. Deducting the loss of the first part of the year of Y376,070, the net profit of the company for the year was therefore Y823,290.00 as shown in the following table:—

Profit (May 1—October 31, 1940)	Y1,199,370.00
Loss (November 1, 1939—April 30, 1940)	376,070.00
Net Profit	823,290.00
Reserve	83,000.00
Pension to staff members	50,000.00
Bonus to staff members	15,000.00
Carried over to 1941	675,290.00

While in April, 1940 the company operated 14 power plants and seven waterworks plants, the company operated 16 power plants and nine waterworks in different cities of Central China, formerly belonging to private Chinese interests. In April, the power plants of the company supplied electric light to 83,361 households and electric power to 3,370 industrial establishments but in November of the same year (1940), the power plants supplied light to 95,551 households and power to 4,071 industrial establishments. The nine waterworks supplied 5,512,281 cubic meters of water in November, 1940.

Central China Telecommunications

The Central China Tele-Communication Company was established on July 31, 1938 with an authorized capital of Y15,000,000, divided into 300,000 shares of Y50 each. The paid-up capital of the company was Y10,000,000. During the year from November 1, 1939 to October 31, 1940, the company had a profit of Y2,144,293. In the previous year, the company paid interest of four per cent to commercial shares and no interest to government shares. During 1940, the company paid interest of six per cent to both the commercial and government shares.

Net Profit	Y2,144,293.83
Carried over from 1939	57,824.74
Total	Y2,201,918.57
Reserve	220,000.00
Special reserve	800,000.00
Bonus to staff members	50,000.00
Pension to staff members	150,000.00
Interest to shareholders at six per cent	600,000.00
Carried over to 1941	381,918.57

The company, which controls and operates all the Chinese telegraph and telephone companies in the occupied areas of Central China delivered 5,160,000 telegrams in 1940 or an increase of 75 per cent when compared with the previous year.

Inland Water Navigation Company

The Shanghai Inland Water Navigation Company was organized on July 28, 1938 with a capital of Y2,000,000, divided into 40,000 shares of Y50 each. The paid-up capital of the company was Y1,074,075. In the year from November 1, 1939 to October 31, 1940, the company made a net profit of Y200,000 as shown in the following table:—

Net Profit	Y200,410.38
Carried over from 1939	8,440.82
Total	Y208,851.20
Reserve	20,041.03
Special reserve	20,000.00
Pension to staff members	12,000.00
Bonus to staff members	8,000.00
Interest to shareholders at ten per cent	138,483.06
Carried over to 1941	10,327.11

This company has the control of all the shipping lines between Shanghai and the interior cities of occupied Kiangsu, Chekiang and Anhwei provinces. The following table gives the quantities of

freight and number of passengers transported by the ships of the company during the past year:—

	Freight Transported	Passengers	Revenue in Yen
1939: November	68,880 tons	140,919	374,000
December	79,080	184,020	505,000
1940: January	91,405	156,876	382,000
February	62,683	121,004	312,000
March	93,840	212,217	490,000
April	127,728	230,796	640,000
May	143,064	269,307	648,000
June	124,149	253,346	651,000
July	114,704	228,871	694,000
August	111,129	261,068	759,000
September	114,776	301,460	716,000
October	137,089	277,194	925,000
	1,268,527	2,637,078	7,096,000

Central China Railway Company

The Central China Railway Company was organized on May 1, 1939 with a capital of Y50,000,000, divided into 1,000,000 shares of Y50 each. The actual paid-up capital was Y35,500,000. The company paid no interest to shareholders both in 1939 and 1940. The business of the company has been improved month by month. At present, it operates the Nanking-Shanghai, Shanghai-Hangchow-Ningpo, Hweinan, southern section of the Tientsin-Pukow and the railways of the Kiangnan Railway Company at Wuhu. In May, 1939 the company operated 700 kilometers of railways but in January, 1941, the company operated 1,100 kilometers of railways. The following tables give the business conditions of the company in different months:—

	Freight Transported in Tons		
	October, 1940	December, 1940	Freight Charges in December, 1940 Yen
Hainan Line	179,834	221,183	1,041,792
Haihang Line	50,485	65,345	224,473
Sooka Line	641	1,744	6,042
Nanning Line	32,019	29,036	1,406,241
Southern Tsingpu	101,114	86,527	873,850
Hweinan Line	41,980	114,075	430,707
	463,865	517,910	Y3,983,150

Central China Bus Company

The Central China Bus Company was established on April 30, 1938 with a capital of Y3,000,000, divided into 60,000 shares of Y50 each. The paid-up capital was Y2,277,500. During the year from November 1, 1939 to October 31, 1940, the company made a profit of Y110,365 as shown in the following table:—

Net Profit	Y110,365.65
Carried over from 1939	20,799.77
Total	Y131,165.42
Reserve	14,000.00
Pension to staff members	5,000.00
Bonus to staff members	5,500.00
Interest to shareholders at six per cent	91,650.00
Carried over to 1941	15,015.42

Chung Hwa Shipping Company

The Chung Hwa (China) Shipping Company was organized as recently as February, 1940 with a capital of Y30,000,000 divided into 600,000 shares of Y50 each. The actual paid-up capital of the company was Y24,500,000. The company was organized for the primary purpose of operating the shipping lines in Chinese waters, which were formerly operated by the Toa Shipping Company. During the period of six months from April 1 to September 30, 1940, the company made a profit of Y111,577 and the Board of Directors decided not to pay any interest during the present year:—

Net Profit	Y111,577.67
Carried over from February to March, 1940	25,665.10
Total	Y137,242.77
Reserve	20,000.00
Pension to staff members	5,000.00
Carried over to 1941	112,242.77

Greater Shanghai Gas Company

The Greater Shanghai Gas Company was organized in December, 1938 with a capital of Y3,000,000, divided into 60,000 shares of Y50 each. The actual paid-up capital was Y900,000. The company was reported to have completed the construction work of the gas plant in the past year but no report was issued about the business condition of the year November 1, 1939 to October 31, 1940.

Shanghai Real Estate Company

The Shanghai Real Estate Company was organized on September 10, 1938 for the purpose of developing the Kiangwan and Woosung area with a capital of Y20,000,000, divided into 400,000 shares of Y50 each. The actual paid up capital of the company was Y15,000,000. During the year from November 1, 1939 to October 31, 1940, the company made a profit of Y461,370 and six per cent interest was paid to the commercial shares.

Net Profit	..	..	..	..	..	Y461,370.11
Carried over from 1939	..	..	..	..	..	77,303.86
Total	..	..	..	..	..	538,673.97
Reserve	..	..	..	..	..	47,000.00
Pension to staff members	..	..	..	..	..	23,000.00
Bonus to staff members	..	..	..	..	..	23,000.00
Interest to shareholders at six per cent	..	..	..	..	..	300,000.00
Carried over to 1941	..	..	..	..	..	154,673.97

Central China Marine Products Co.

The Central China Marine Products Company was organized on November 6, 1938 to operate the fish market at Woosung with a capital of Y5,000,000, divided into 100,000 shares of Y50 each. The actual paid-up capital of the company was Y3,165,000. During the year from November 1, 1939 and October 31, 1940, the company made a profit of Y722,245 and the interest for the shareholders was increased from four per cent in 1939 to ten per cent in 1940.

Net Profit	..	..	..	..	..	Y722,245.36
Carried over from 1939	..	..	..	..	..	13,525.47
Total	..	..	..	..	..	Y735,770.83
Reserve	..	..	..	..	..	73,000.00
Pension to staff members	..	..	..	..	..	37,000.00
Bonus to staff members	..	..	..	..	..	25,000.00
Interest to shareholders at ten per cent	..	..	..	..	..	316,500.00
Carried over to 1941	..	..	..	..	..	284,270.83

Central China Silk Company

The Central China Silk Company was organized in August, 1938 to operate the numerous Chinese silk filatures in Kiangsu and Chekiang Provinces with a capital of Y10,000,000, divided into 200,000 shares of Y50 each. The actual paid-up capital was Y6,500,000. During the year from November 1, 1939 to October 31, 1940, the company made a net profit of Y2,913,100 as shown in the following table:—

Net Profit	..	..	..	..	..	Y2,913,098.50
Carried over from 1939	..	..	..	..	..	816,476.06
Total	..	..	..	..	..	Y3,729,574.56
Reserve	..	..	..	..	..	800,000.00
Special reserve	..	..	..	..	..	700,000.00
Pension to staff members	..	..	..	..	..	700,000.00
Bonus to staff members	..	..	..	..	..	50,000.00
Interest to shareholders at ten per cent	..	..	..	..	..	650,000.00
Carried over to 1941	..	..	..	..	..	829,574.56

New Portents in Asia

(Continued from page 84)

These demands as set forth in one of several telegrams that were published, were as follows:—

1. The suspension of military operations against the Communists throughout the nation.
2. The suspension of political pressure and the recognition of the Chinese Communist Party and other parties, and the release of all persons arrested in Sianfu, Chunking, Kweiyang and elsewhere: the re-opening of bookstores closed in different cities and the removal of postal bans on books, magazines and newspapers representing these parties' views.

3. The suspension of pressure against the "Hsin Hua Jih Pao" (Communist newspaper).

4. The recognition of the legal position of Shensi, Kansu and Ninghsia provinces as a special district.

5. The recognition of democratic administrations in the occupied areas.

6. The maintenance of present defence position in North and Central China, as well as in the North-west.

7. In addition to the 18th Group Army, another group army to be established with two group armies controlling six army corps.

8. The release of General Yeh Ting and the restoration to him of his former position.

9. The release of those arrested in southern Anhwei province, and compensation to those killed.

10. The restoration of men and arms captured in Anhwei.

11. The establishment of a joint committee comprising delegates of all parties, each party to have one delegate, with the Kuomintang delegate as chairman and the Communist delegate as vice-chairman.

12. One of the Communist Party delegates to be elected a member of the presidium of the National Peoples' Political Council.

Leader Indicts Communists

After accusing the Communists of attempting to establish an armed force of their own, and utilising the present national crisis to attempt to gain political control of the country, Generalissimo Chiang Kai-shek revealed for the first time that irregular activities on the part of the Communist forces had been an important cause in delaying the Chinese counter-offensive against the Japanese forces in China.

Gen. Chiang Kai-shek expressed the hope that the Communists would fulfil their pledges to carry out military orders and join the united front against the Japanese invasion so that an early victory may be achieved.

The Secretariat of the Council received two communications from the Communist delegates to the Council, containing 12 settlement proposals and 12 provisional settlement proposals respectively, which may be grouped under military and political party headings.

The military demands propose that the Government may not discipline troops which defied Government orders, otherwise the Government military authorities should be punished, while the losses of mutinying troops should be compensated.

The political demands suggest that within the jurisdiction of the National Government, a special Communist district should be established and a special form of political Administration should be recognized and also that the Government may not lawfully check the unlawful activities of certain groups.

It is further suggested that the Government recognize the so-called democratic administration in the occupied areas.—In other words, the Communists are attempting to utilize the present national crisis to gain political control of the country.

In his report, Gen. Chiang Kai-shek said: "These party demands suggest that only the Chinese Communist party should enjoy a special privileged position in the National People's Political Council, otherwise they will refuse to attend the Council meetings.

"If we accept such demands, the Chinese Government ceases to be a government, while the Council ceases to be the people advisory body."

The foregoing proves all too clearly that the traditional pattern of Chinese warfare has undergone no change, and that from all the destruction and strife in their homeland the Chinese militarists have learned nothing. For the suffering masses of Chinese people no least betterment of their condition would result if every Japanese soldier in the land were to be withdrawn. When the Chinese armies stop fighting with Japanese, right merrily they will go back to fight each other in the time-honored Chinese way.

A Foreign Minister's Shopping Tour

(Continued from page 86)

That, however, is little consolation for Foreign Minister Matsuoka as pondering and weighing the situation, he continues to shop about for his country's future. A little gesture from Washington, as hinted in recent American news cables, would be timely indeed for a world of good.

The Evolution of Dredgers

By J. A. S. ROLFE, M. INST. C.E., A.M.I. MECH. E.

(The Dock and Harbor Authority)

WHEN man first sat astride a log and launched himself on the waters, he bequeathed to posterity a problem to which the *s.s. Queen Elizabeth* and the great docks and harbors of the world are as yet an incomplete solution. The increasing size of ships has made a steady demand on the Civil Engineer throughout the ages for an equal increase in the depth of water available in harbors and docks. Unfortunately, we have no records of the manner in which our predecessor met this demand prior to the seventeenth century, but it is quite safe to assume that the builders of the ancient harbor of Crete, of Sidon and of Rome must have studied the interesting problems that dredging presents and have devised some method of surmounting them.

The "Spoon and Bag"

It is probable that primitive man astride his log found that by dragging away the bed of the river near the banks he could land without the necessity of wading through shallow water and in making this basin for his craft he laid the foundation of harbor engineering. In stirring up the mud, he no doubt found that a pole with a flat piece of wood fastened across its extremity served as an efficient mud rake and thus was the first "dredger" born, and so useful was this tool that it has survived to the present day and still can be seen in use in tidal creeks. The logical development of this tool was the substitution of a bag for the head of the rake, whereby the operator could deposit the dredged material ashore or dispose of it by some other means. This developed into the "spoon and bag" dredger and is another example of a primitive tool which is still in use in the present time in shallow waterways. In course of time, the "spoon and bag" dredger increased in size in order to meet the demand for deeper water, and Edward Cressy in his *Encyclopaedia of Civil Engineering*, compiled in 1847,

describes a machine of this type which was used in Venice. He says, "the machine at Venice probably first suggested our modern dredger; it consisted of an oblong pontoon, covered in, on the deck of which the machine was worked; its length was nearly 50-ft., and its breadth a little less than half; below the deck the space was used by the workmen as a lodging place. The Mechanism attached was a large wooden beam, which moved on a pivot in its centre; this beam was formed of tapering pieces, about 50-ft. in length, and together 3-ft. in thickness; there were five rows, bound and hooped round with iron; this strongly constructed beam was furnished at one end with two nuts, into which worked a perpendicular screw of beech, upwards of 30-ft. in height, and about 14 or 15-in. in diameter. This screw worked in a socket or plate, fixed at the bottom of the pontoon, and this being provided with a windlass below the deck, the screw was made to elevate or depress the huge wooden beam, which usually lay in a horizontal position.

At the outer end of the beam, a large iron spoon was worked, which had by means of pulleys an alternate motion of rotation given to it by two vertical cylinders placed within the pontoon; the iron spoons were opened and shut by ropes and pulleys, and the dredging action was commenced by slightly depressing, then raising the beam; by the first movement the cover was moved, by the second the spoon was opened; after it had filled, it was again covered and lifted out of the water; such a heavy complicated apparatus consumed much labour, and required to be moored very strongly to the place where it was worked, and the manoeuvring of the perpendicular screw, which gave movement to the weighty timber beam, was attended with painful and laborious exertions.

Eight men were required to work it, and they generally raised in a day about sixty cube yards from a depth which did not exceed 14 or 15-ft.; when a greater number of men were employed, the quantity raised was proportionately greater, and twelve, which

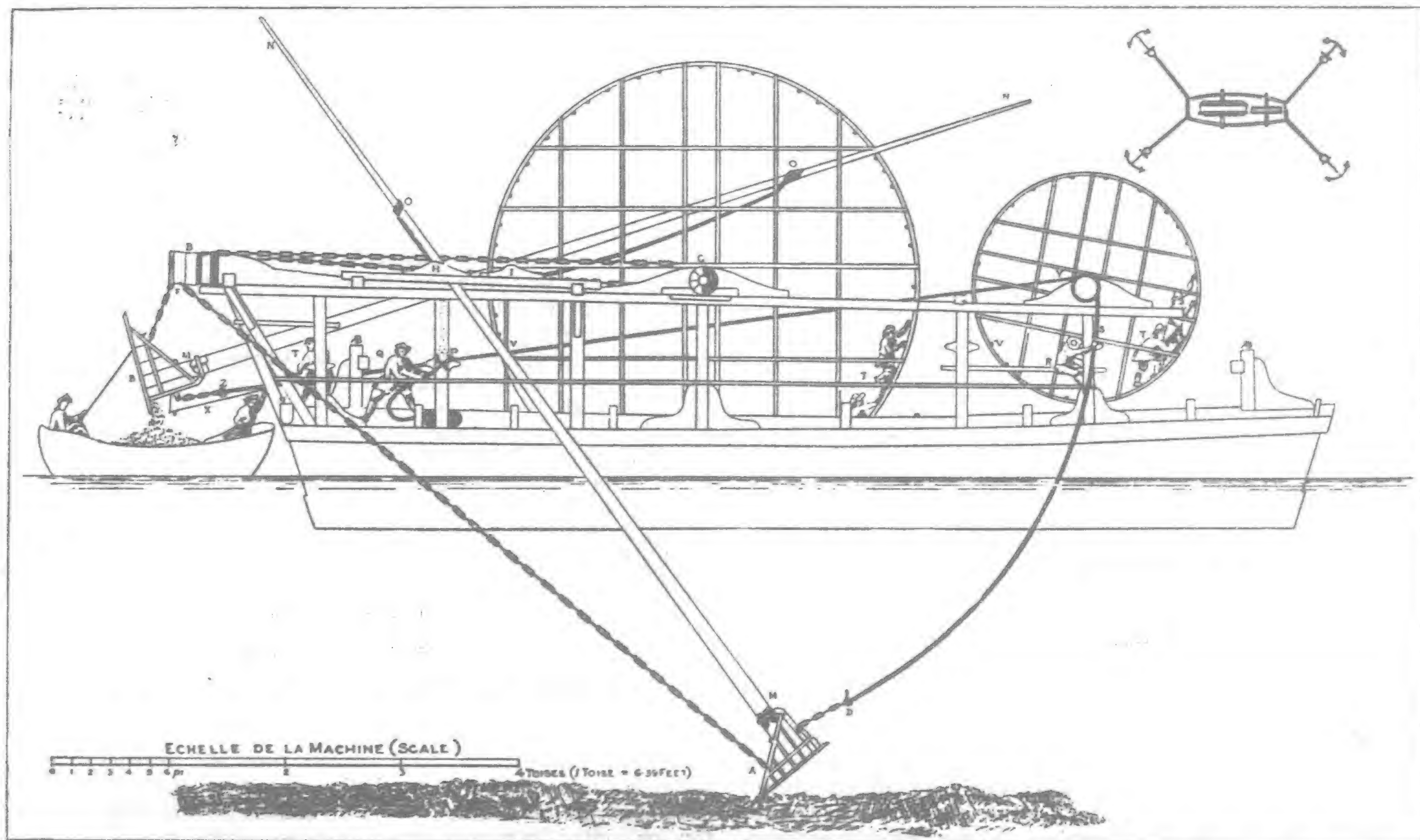


Fig. 1.—Side elevation of the machine for deepening the port of Toulon in the 18th Century

were as many as well could work at one time, have been known to lift more than a hundred cube yards. The spoon or drag contained two and a half cubic yards, and the mean time for lifting it was a quarter of an hour; thus with forty extractions in a day considerable space was cleared: such a machine was said to have cost upwards of 800 pounds."

The Dipper

It is not known exactly when the "bag and spoon" developed into the dipper dredger as we know it to-day, but we do know that a dredger comparable in operation with the modern "dipper" was in use in Toulon Harbor in the Eighteenth Century. This is very fully described by "Belidor" in his "Architecture Hydraulique," published in 1770, and is shown in Fig. 1, which is a copy of a print from this work. The bucket shown has a capacity of about 50 cubic feet and the dredging depth is about 16-ft.

The introduction of steam permitted an increase in both the size and output of dredgers and in 1796 a dipper was at work in Sunderland Harbor, the motive power being a steam engine designed by Boulton and Watt of Soho, Birmingham. This is described by Messrs. James Watt and Company in a letter to J. J. Webster, Esq., M.INST.C.E., in connection with his paper on "Dredging Appliances," read before the Institution of Civil Engineers in 1886 (Vol. LXXXIX—1886-7, Part III, Proc. Inst.-C.E.). In this letter it is stated that "our firm supplied, in 1796, a beam-engine, having a steam cylinder, 12½-in. in diameter, and 3-ft. stroke, for working the spoons, which were previously worked by men, for cleansing Sunderland Harbor. These spoons were in the form of a truncated cone, the narrow end of which was closed; and to the other, or open end, was fixed a spade bit. They were made of a hide of leather, having an iron rim. The engine was to be fixed in a boat, 20 or 22-ft. wide by 60-ft. long."

The Bucket Dredger

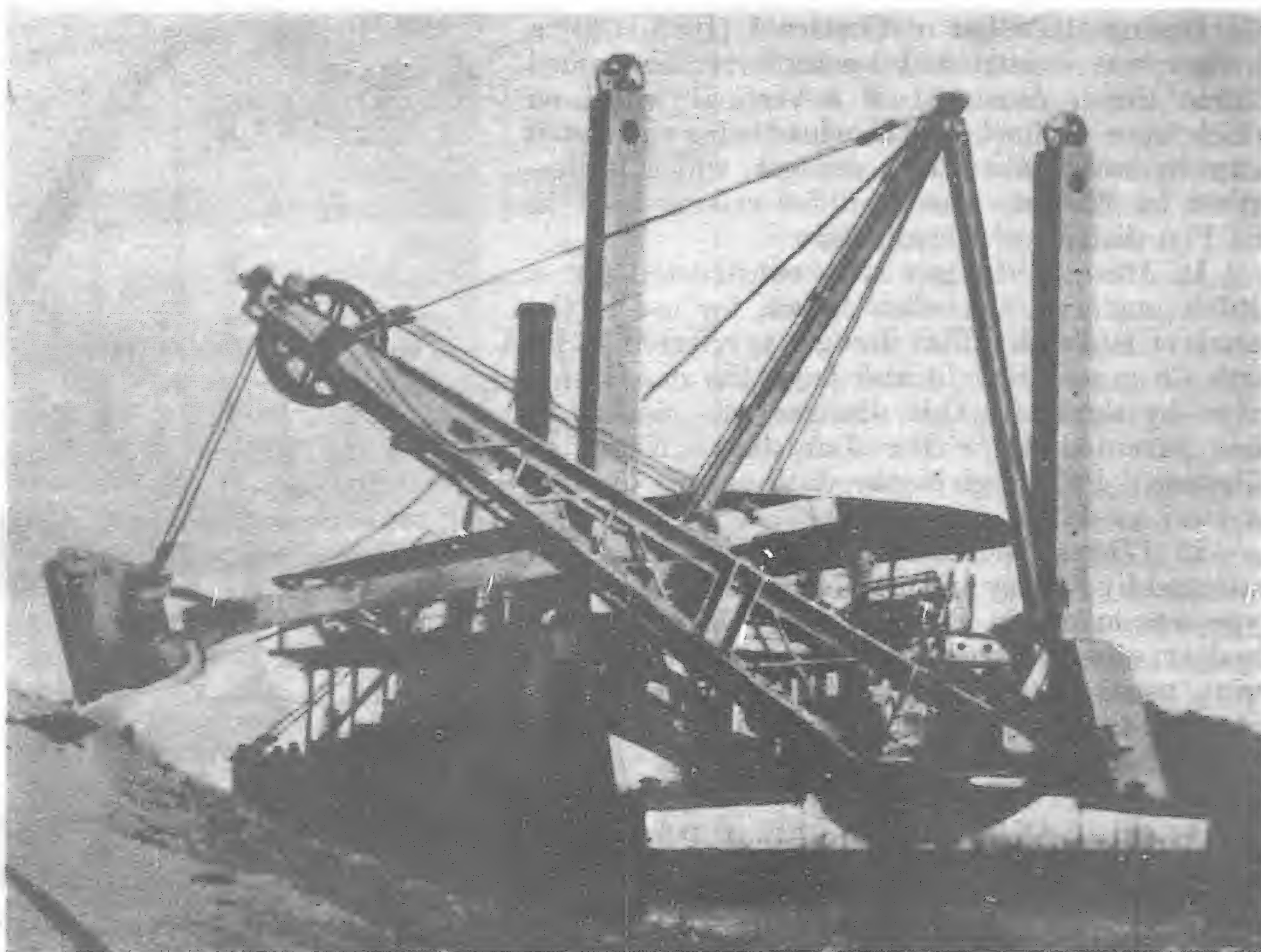
The bucket dredger would seem to be a logical development of the "bag and spoon," improvements in prime movers allowing a succession of bags to be raised, although some early bucket dredgers were operated by manual or animal power. As with other types of dredgers, the date of the first bucket is very uncertain. Prelini gives the date as 1591, the inventor being Veranteus.

A later reference is that in "Shipbuilding from its beginning" by Von Konijnenburg, issued by the Permanent International Association of Congresses of Navigation in Brussels. In this article the date of 1632 is given as being the year in which one Jan Jantz Nieng, a citizen of Hoorn (Holland), invented the "diepmolens." This dredger was called the *Dieplust* and is described as follows:—

The *Dieplust* extracted the mud by means of a trough with low straight sides, lined at its lower end with iron. When the boat was moved, by means of a cable attached to an anchor, the lower end of the trough entered into the mud as far as it could. The ladder of the dredge was suspended inside of the trough and to its endless chain were fastened pieces of plank of about the same width as that of the trough. These pieces of plank tumbling around a hexagonal or octagonal drum at the lower end worked down into the mud of which they brought up a certain quantity and discharged it through a hole at the top of the trough.

There was no question of buckets to bring up the dredged materials, these having only made their appearance with steam dredgers.

The trough, with the ladder, could be lowered or raised by means of a windlass; it passed through an opening which was not in the axis of the board. In the larger half of the vessel was placed the shaft, which, by means of gearings, transmitted to the ladder the movement produced by the horses. These gearings were similar to those of the old wind mills. A horse-power and a stable were constructed on the deck of the boat."



Modern dipper dredger

Doubt, however, has been expressed regarding the date of this invention, as in 1628 the following entry appears in the Resolutie Boek van de Staten van Vlaanderen of 1628—1830, Fo. 16 (Archives of the State at Ghent, No. 553):—

"(1) By act of May 22, 1628, it is ordered that there be paid to Adam Clippens Engineer who built the mud mill, a sum of 100 florins for the bid which he presented."

Whether Clippens' dredger is similar to that of Neing or whether the earlier date is incorrect is not known. It is certain, however, that the first mechanical dredger of this type was in use in the early part of the 17th Century.

Cresy describes a machine called a *Chapelet*, which was undoubtedly a bucket dredger, but no date is given. His description is as follows:—

"The *Chapelet* was composed of three rollers, two of which touched the ground, and the other was placed above a timber scaffold, on which the soil dredged was to be raised, round these rollers worked an endless chain formed of large links, alternately flat and square; to this was attached four or more scoops or scuttles, placed at regular distances, made of sheet-iron; these were pierced with holes, and provided with a strong, projecting beak, which not only entered, but cut its way into the mud or earth below. The cylinders were armed with iron spikes which entered the square links of the chain, and turned round on pivots, working within a frame made for the purpose, of timbers sufficiently strong to retain them, and put together so that they could be raised or lowered as the depth to be dredged required. The whole was put in motion by a wheel and winch, placed parallel to the cylinders, and by which they were turned; the axis of the winch working in a lantern turned the cylinders, and they in their motion brought up the loaded scuttles made fast to the endless chain; when either of the scuttles had arrived above the upper cylinders, it became included, and deposited its contents, which were immediately drawn away by a vessel or trough, and in this manner the scuttles were kept in motion and discharged. When the depth was greater or less, the machine was made to accommodate itself by the introduction or taking away of some of the links, and mounting higher the two lower cylinders. The winches being turned, moved the lantern fixed to their common axis; this engaging in a toothed wheel fixed to the upper cylinder, in turning drew the chain and scuttle attached to it, and also turning round, occasioned the descending scuttle to enter the ground, and to elevate the loaded one to the top of the machine, where it was thrown over, and deposited its contents upon a hinged trough, attended by a workman, who directed its further course."

During the reign of Charles I (1625-1649) a dredger was constructed by an inventor named Balme which consisted of a vertical wheel on which were six buckets, the wheel being supported between two boats. This dredger, which is described by Knight, was used for raising mud in the Fen district of Lincolnshire.

In 1680, a dredger was constructed by a Dutch engineer, Cornelius Meyer, for use in the canals of Holland. This dredger is referred to by both Cresy and Knight and from the description given by the latter this dredger was similar to that invented by either Jan Jantz Nieng or Clippens. Prelini gives the date of this dredger as 1685.

In 1718 a bucket dredger was designed and patented by Savory and in 1747 a dredger of this type was in use in England. In 1781 a bucket dredger was constructed in England, one horse being used as the driving force. Prelini makes reference to these dredgers but does not give any description of them.

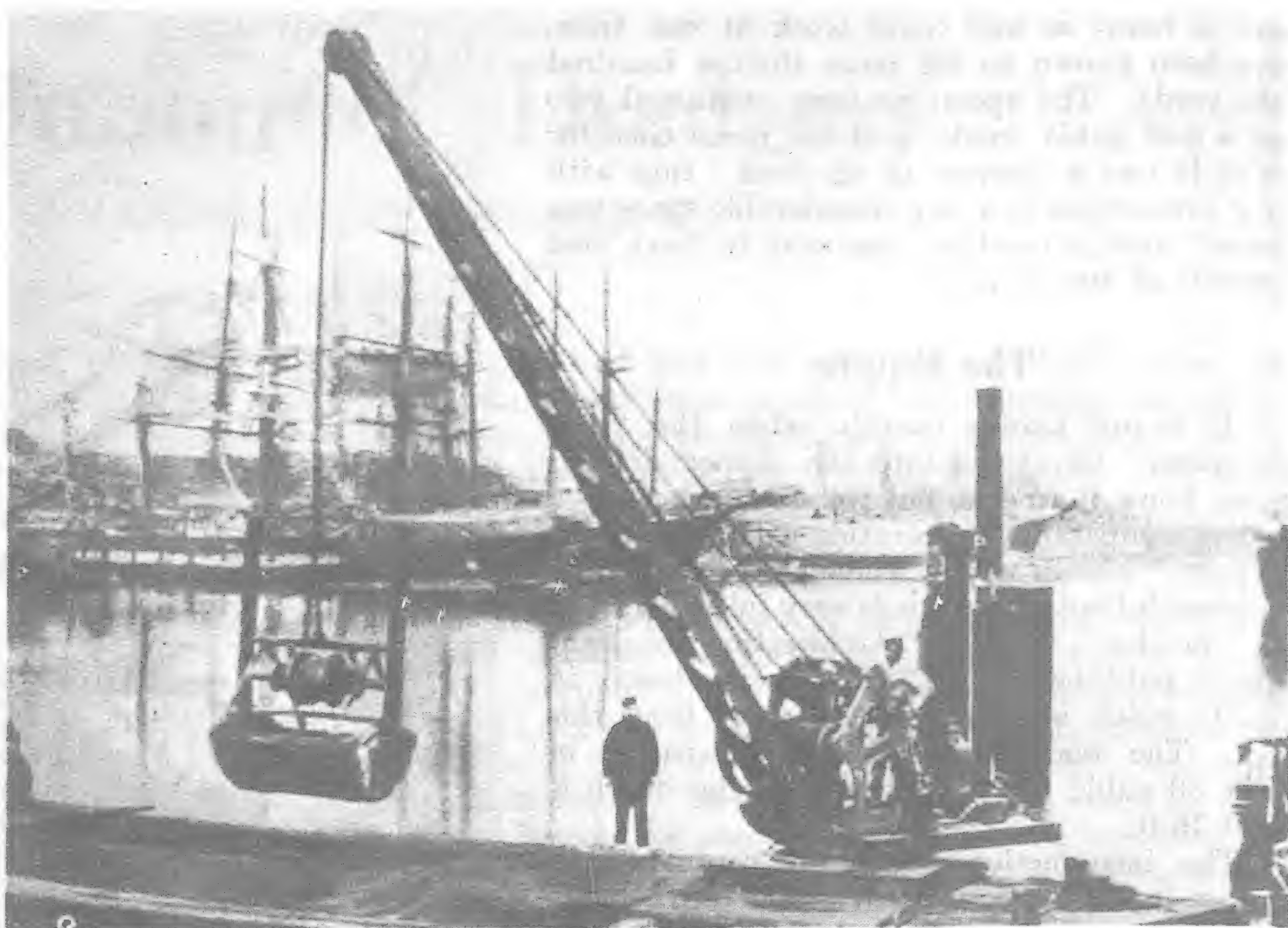
Application of Mechanical Power

The first power driven bucket dredger in England appears to have been used at Hull early in the nineteenth century. Cresy gives a very clear account of this dredger. No apology is made for again quoting at length from his article as it is an interesting description of an early bucket dredger.

"The machine employed by the Hull Dock Company in 1802 had eleven wooden scuttles working on a ladder that passed over rollers, the motion given by a horse-wheel; those now used in the harbors and navigable rivers, worked by powerful steam engines, have a series of iron or copper scuttles attached to a chain, which like a chapelet works round a beam elevated at the side of the vessel, and brings up large quantities of ballast at each dip. The fly-wheel of the dredging machine is turned by a large spur-wheel fixed on the shaft, acting on a pinion on the axis of the fly-wheel, to give it a greater velocity than the crank, by which means a smaller fly-wheel is sufficient to regulate the motion of the engine. The motion is conveyed from the steam engine to the chain barrels by the inclined shaft, shown in the section; at the lower end is a bevelled wheel, which receives its motion from another fixed on the main shaft of the engine. At the upper end also of the inclined shaft is another bevelled wheel, working in another fixed to the shaft, and situated in a line with the centre of the two chain barrels; at the two extremities of this shaft are two wheels, which communicate power to the chain barrels, and bring up the ballast; an engine of 16 horse-power, dredging on a moderate depth, will raise 35 tons in an hour, and consume about 343 pounds of Newcastle coal in that time. The upper roller is a square barrel, as is that at the lower end, and around them passes the double endless chain, each alternate link of which carries a bucket; these are pierced full of holes, to allow the water to drain out as the sand or gravel it brought up. The mouths have a semi-circular form, to prevent their sticking fast during the operation."

A power driven bucket dredger appears to have been worked on the River Thames in 1804 by Mr. John Hughes, who raised, in one day, 2,000 tons of spoil from a depth of 30-ft. A complete description of this dredger is not available, but we learn from Cresy that "it had four rollers, each of which had one spoon; the rollers were made to move at 10-ft. per minute, and each spoon could bring up 15 cwt. at a time." It was apparently driven by a 30 horse-power engine. Knight in his Dictionary of Mechanics also refers to this dredger and gives its cost as £8,000.

A steam-driven bucket dredger appears to have been used in Sunderland Harbor in 1800 or thereabouts. In the paper by Webster already referred to, he quotes a reference made in the local press in 1833, reading as follows:—"October, 1811. A very curious machine, for cleansing and deepening Sunderland Harbor, was set to work. A steam-engine of great power was erected upon a floating barge, which continually drove round a number of iron buckets fastened to a chain, which filled themselves with sand and gravel



The first grab dredger, built by Messrs. Priestman Bros., Ltd., for dock and harbor dredging and supplied to the Hull Docks Company in 1878

at the bottom of the harbor, and successively emptied themselves at the top of the shaft into a spout ready to receive them. This machine could lift 55 tons of ballast in thirty-five minutes."

From 1,800 onwards, the bucket dredger develops its present form, growing more powerful to cope with the increasing demands for deeper water. Improvements in material and manufacture also assisted in this development until from the midget used in Sunderland, mentioned by Webster, whose buckets in all probability did not have a capacity of 10 cubic feet or the dredger an output of 45 tons per hour, we arrive at the present-day monsters with 54 cubic feet buckets and an hourly output of 2,000 tons.

The Grab

The "grab" dredger is a further illustration of the development of a very simple manual operation, that of excavating soft materials with two hands, the fingers acting as "tines" and the ball of the palms pressed together to form the hinge. At what period in our history this action was first mechanized it is not known. It is claimed that it is a recent development. This, however, it is difficult to agree to. Mr. W. J. E. Binnie, M.A., M.INST. C.E., in his Presidential address to the Institution of Civil Engineers in November, 1938, refers to the siege of Syracuse where Archimedes in defending that city against Marcellus mounted "Machines, which must have resembled cranes with a balanced jib, were built behind the walls out of view of the attackers, and when the galleys had reached the walls, the jib was swung outwards by means of chains and pulleys. Over the pulley of the jib ran a chain to the end of which heavy weights were attached, which were dropped on to the galleys, causing great damage and confusion. The cranes were also equipped with powerful claws or grabs which seized the prows of the galleys and lifted them right out of the water, the vessels becoming full of water when dropped back again and many being capsized. The grabs must have been very powerful when the size of a Roman galley is considered, and one would be inclined to treat the story as a fable if confirmation were not forthcoming from Marcellus himself, who wrote that 'his vessels were treated as buckets to draw water.'" This must be the very earliest known reference to a grab machine employing the principles of the modern dredging grab. Dekker in his "Dredging and Dredging Appliances" gives an illustration of a grab dredger which is dated 1617. This is followed by a reference by Sir Benjamin Baker in his discussion on a paper on "Plant for Harbor and Sea Works," read before the Institution of Civil Engineers by Pitt, to the grab being an invention of one, M. Gouffe, which is described in the Proceedings of the Academy of Sciences in 1703.

Prelini dates the first grab as 1773, its inventor being Mr. Dominico Ferra. Whatever the date of its first invention, the

"grab" has altered very little in principle until quite recently. It has always consisted of a pair of scoops, in section resembling a quadrant of a circle, which are pivoted on a cross shaft at a point approximately to the radius of the scoops, the scoops when opening describing a circular path. The method of opening only varied. The grab of 1617 referred to by Dekker and that of Gouffe were definitely double chain grabs but we are uncertain as to how that used by Archimedes or invented by Ferra were operated. When this machine was first extensively used on dredging, the single chain control was favored. This gave way at a later date on account of its uncertain action under water to the double chain control, which on account of its simplicity is still in use. The only departure from the orthodox grab is that of the "level cut" grab introduced by Messrs. Priestmans and brought to the notice of the general public by the makers of a well-known beverage. In this grab, the jaws move in a horizontal direction and not radial.

Suction Dredging

It can fairly be claimed that there is one type of dredging which man has invented and that is suction dredging. "It is true that in nature the family of molluscs use the principles of suction dredging, but even they possess nothing similar to a centrifugal pump. The first suction dredger was designed, it is claimed, by Bazin, who in 1867 exhibited a model of this type of dredger in the Paris Exhibition. It was developed by the inventor for use in the Suez Canal. Bazin's dredger used a centrifugal pump to create a suction through a tube, one end of which was connected to the pump suction, the other end being dragged through the sand or mud by the dredger which in this type of dredging, is continually on the move. The suction end of the pipe had a slight bend so that the inlet was roughly parallel with the surface of the material to be dredged. The pump being set to work created a powerful suction which with the suction inlet of the tube buried in the material to be dredged, sucked the material up and discharged it into a hopper. In 1871 a similar dredger was used in the United States of America.

Knight in his Dictionary of Mechanics, published about 1873, already referred to, gives a sketch of a different type of suction dredger in which the suction tube is led to the mud from an airtight tank from which the air was exhausted by a suitable pump. The air being exhausted from the tank, it automatically filled with mud after which the dredger proceeded to the dumping ground and discharged the load. Unfortunately he does not give the inventor's name or give the date of the invention, nor does he state if the dredger was ever constructed.

Webster, in his paper already referred to, gives a description of the Woodford Sand Pump which appears to have been a suction dredger. In this dredger the centrifugal pump was lowered at the end of the suction pipe into the mud. The impeller which was in a horizontal position, was driven from the deck of the dredger by means of a vertical shaft. The date of this dredger is not given, although a modification of Woodford's machine was in use in

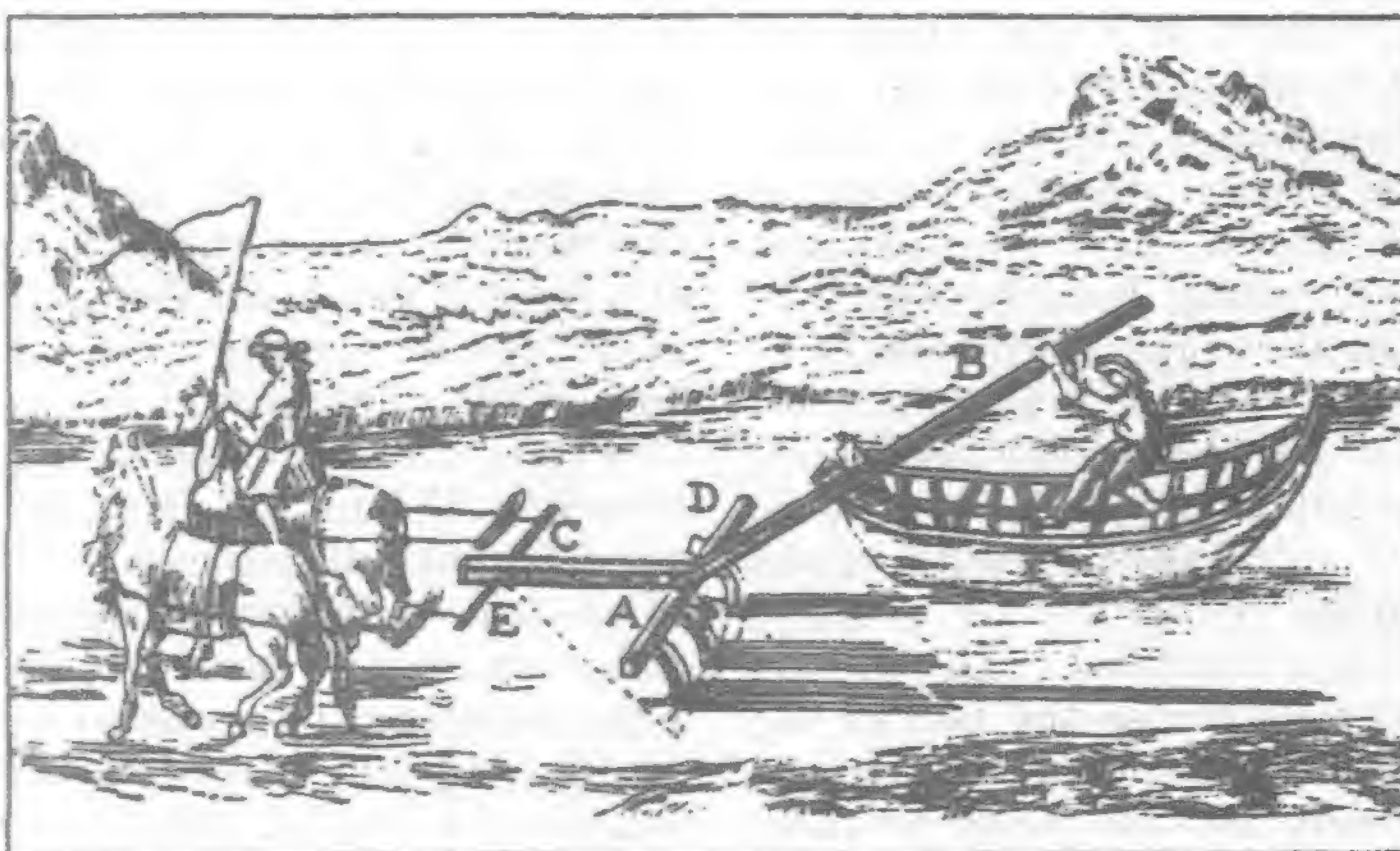
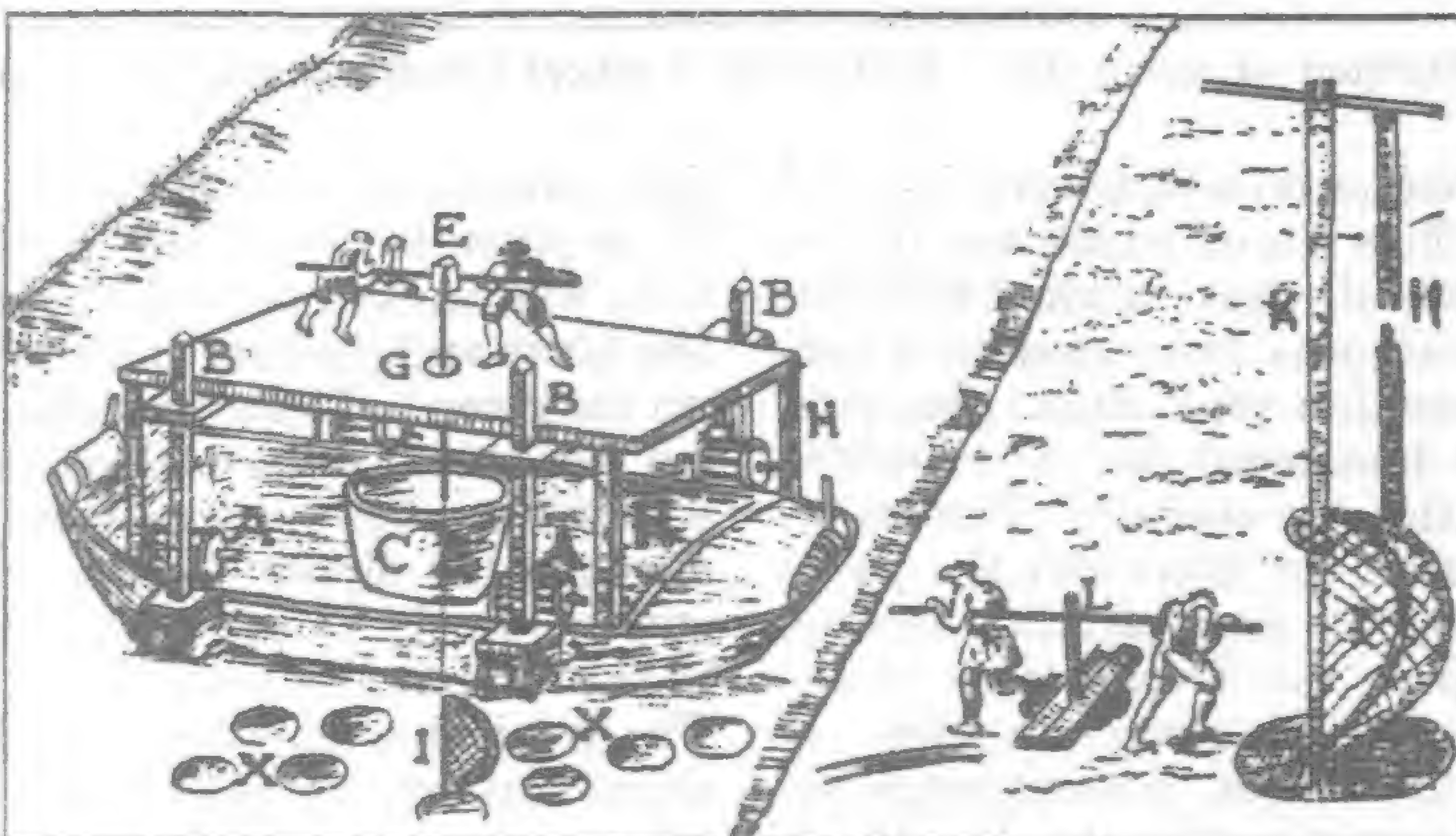
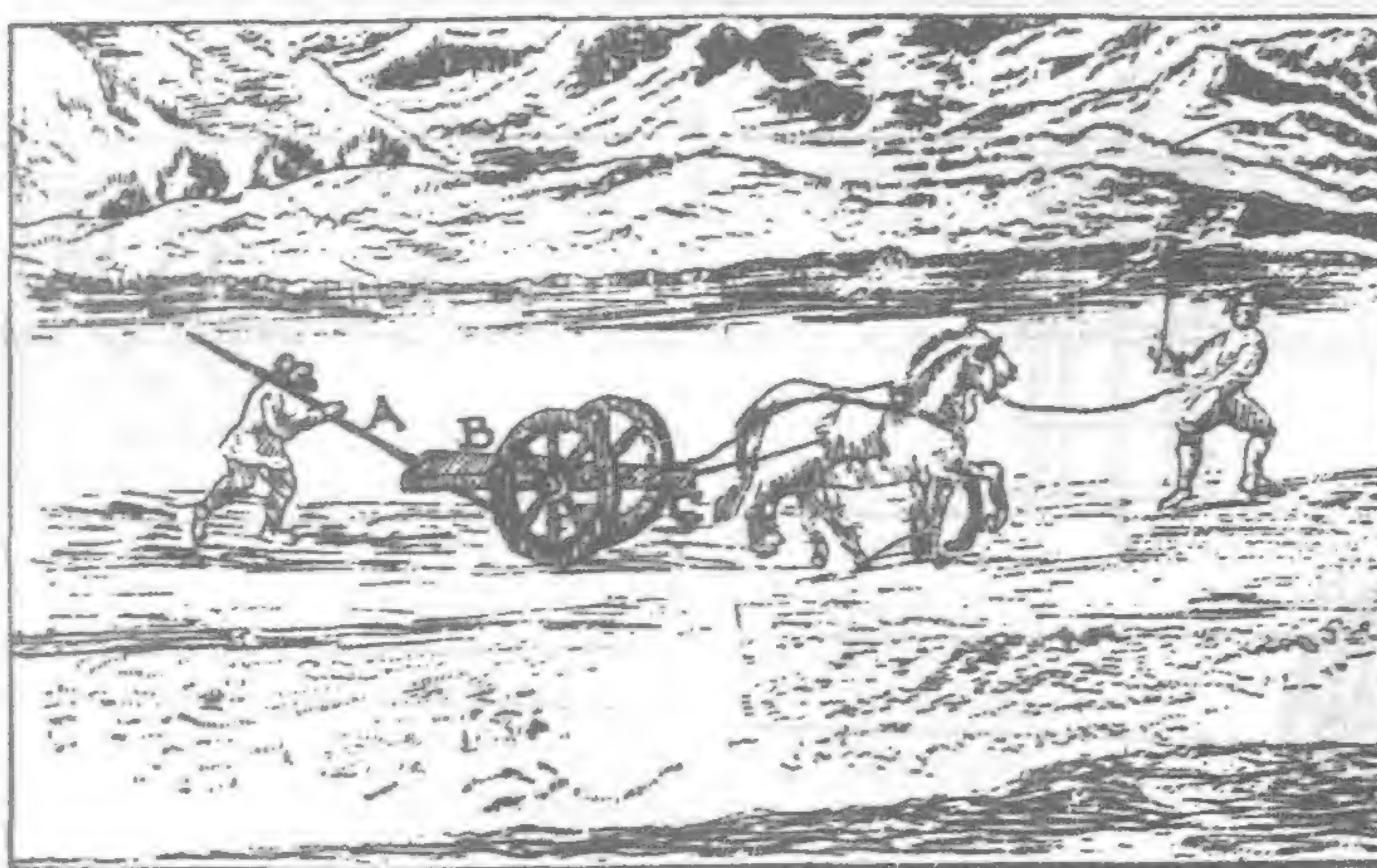


Fig. 2.—Methods of deepening small rivers and canals (Belidor)

may best be described as "hole" dredging, as its function consists in removing large quantities of sand whilst remaining at anchor. The sand, being what is known as a "free getting" material, flows freely towards the nozzle being assisted by littoral drift in the case of sand bars in the open sea or by the flow of the current in the case of sand banks in rivers and channels. Here it might be mentioned that Belidor seems to have anticipated this method of "hole" dredging with a dredger illustrated in Fig. 2. Another point worthy of notice in this illustration is that he also made use of "spuds" to steady the dredger.

The drag suction dredger differs from the sand pump in its method of operation only as it dredges while under way and not at anchor, and its development follows that of the sand pump.

The Cutter Suction Dredger

The first cutter suction dredger appears to have been devised about the same time as the first drag suction dredger. The principal difference between the two is that whereas the drag suction dredger relies on the head being dragged through the spoil to break it up, the cutter suction has a revolving head provided with cutting blades which definitely cuts the spoil. Webster in his paper already referred to describes the "Schmidt" Sand Pump and gives an illustration of the dredger. It was invented by A. W. Von Schmidt and used in Oakland Harbor, California, U.S.A. This

Amsterdam in 1868, so that this dredger must have been invented about the same time as Bazin's machine. In principle, Bazin's dredger remained unaltered until about 1900, when Herr Otto Fruhling, a German engineer, invented a special type of head for use on the inlet end of the suction pipe. As has already been stated, the suction inlet was roughly parallel to the surface of the mud to be dredged, with the consequence that if the inlet was allowed to sink too deeply in the mud it choked, whereas, if it was kept near the surface, it sucked in excessive quantities of water. Fruhling, therefore, devised a head which had its inlet at roughly 90° to the surface of the mud and was connected to the suction tube by a special bend. The head was also provided with fixed cutters to break up hard materials. This type of head was lowered down until its inlet was sealed in the mud and it was kept in this position as the dredger moved forward. This improved head resulted in a great increase in the consistency of the mud raised, for whereas the early pattern head only raised only about 25 per cent mud, the new head raised up to 80 per cent mud.

Subsequently a new type of head was designed by Allen in America, which is also an improvement on the original head used by Bazin.

Suction Dredger Types

Modern development of the suction dredger has resulted in these dredgers being divided into three classes, the sand pump, the drag suction and the cutter suction. The sand pump has been evolved to deal with sand banks and bars and its mode of operation

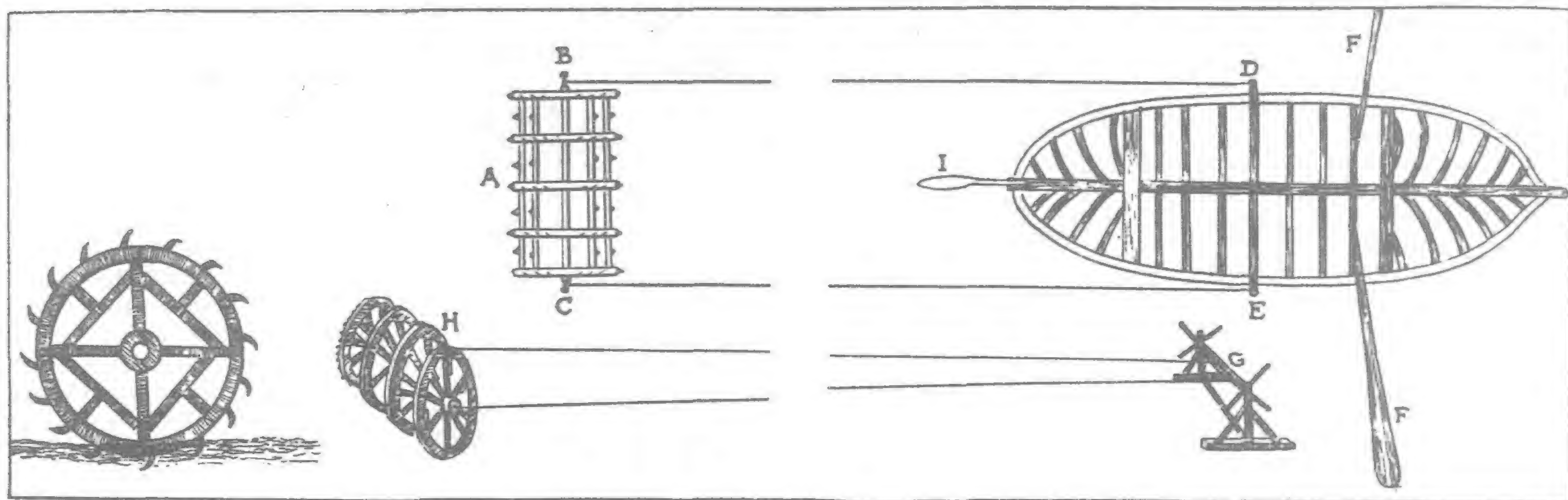


Fig. 3.—Method of using the "Hedgehog" wheel for deepening rivers and canals

dredger had a horizontal disc 6-ft. diameter on which were fastened a number of plough shaped cutters. This wheel, which was driven by a vertical shaft from the deck of the dredger, worked with the cutters downwards inside a hood which was connected to a centrifugal pump on the dredger by a suction pipe 20-in. diameter. When in operation the hood and the horizontal disc was lowered to the harbor bed and the pump and the disc started. The blades on the disc broke up the material inside the hood and the pump raised it to the surface. Unfortunately the date of this invention is not given, although it is described in the Transactions of the Institute of the American Society of Civil Engineers in 1886. A cutter suction dredger which must have been contemporaneous with "Schmidt's" is described in a paper written by Mr. W. J. Barnes, M.INST.C.E., F.R.G.S., Superintendent of Canal Irrigation Bahawalpur State, on "Dredgers and Dredging," which was published in 1876 in Volume 5 of the *Professional Papers on Indian Engineering*. The Author describes a suction dredger which he and two others, Messrs. Simons and Brown, had invented and patented in 1874. In this dredger the cutting head consisted of a U shaped tube joined to the main suction pipe at the center of the curved portion and at 90° to it to form a T head, the open ends of the tube pointing downwards. In each of the open ends of the U tube was mounted in a rectangular opening a cutter with eight arms, the arms being set slightly spiral in the length of the cutter. These cutters were driven from the pump by gearing. The arrangement of the driving gear is not described. The suction tube was dragged backwards and forwards across the bed of the canal and the rotary action of the cutters broke down the material of which the canal bed was formed ready for the pump to suck. In each arm of the U tube a valve was placed so that either cutter could be shut off from the pump. It is unfortunate that the date of the invention of the "Schmidt" Sand Pump is not given as it is just possible that Barnes' dredger was invented first. It is not known whether Barnes' dredger was ever constructed. A further point of great interest was the peculiar shape of the hull suggested by Barnes. In place of the ordinary ship shape hull he proposed a hull diamond shape in plan. The idea being that in a narrow channel this type of hull could pivot on one extreme of its beam, which was, of course, the smaller axis, allowing the head of the dredger to make a full sweep of the width of the channel. In modern cutter suction dredging the same effect is obtained by pivoting the dredger about a spud placed in the after end.

Schmidt's dredger is in principle exactly similar to the cutter suction of to-day, which consists of a rotary cutter, a suction tube and a centrifugal pump. The cutter, which varies in diameter according to the magnitude of the work, consists of six or more renewable steel blades which are arranged in a spiral. This cutter, which is driven from the dredger, in rotating, slices up the spoil ready for passing through the suction pipe.

Eroding Appliances

It has always been, and still is the aim of dredging engineers, to make Nature do its own cleaning up in harbors or waterways where a strong ebb tide runs, and quite a number of devices have been developed for this purpose. Belidor in his "Architecture Hydraulique" illustrates four machines used for this purpose. The

first consists of a cart drawn by two horses with a long pole attached by a pivot to the tail of the cart. This pole was operated by a man who walked behind the cart. From the print it appears that the horse and the cart and the man operating the pole which stirred up the river bed were actually in the river while the attendant who led the horses walked along the river bank. The second machine which has already been partly described in connection with the spuds of the dipper dredger, consisted of a barge mounted on four spuds. In the center of the barge is a vertical shaft reaching down to the mud and on which is mounted a scoop which acts as a cutter. The vertical shaft was rotated by two men and the action of the scoop was to cut holes in the mud. It is not clear whether the filled scoop was raised on to the deck of the barge and cleared or whether it was raised out of the hole and the run of the stream left to clear the scoop which, by the way, appears to be made of network. In any case, the action of running water over a number of holes drilled in the river bed and the subsequent collapsing of the walls between the holes would have the effect of deepening the river. The third device is similar to the first except that instead of the stirring pole a regular plough with three cutters is employed. This plough is drawn by two horses, on the river bank this time, and is guided by a man in a boat. The fourth machine, called by Belidor a "Hedgehog" consists of five wheels connected together with distance pieces to form an open roller. On the tread of the wheels and on the distance pieces are fixed long spikes. This roller which was mounted on a spindle, the outer ends of which were connected by ropes to a beam laid across a boat, was lowered to the river bed and towed along by means of the barge. The wheels in revolving dug the spikes in and stirred up the river bed, the material thus stirred up being carried away by the stream. As has already been stated, this book was published in 1770, so these inventions are at the very least two hundred years old. The Hedgehog Appliance is shown in Fig. 3, which is a copy of the original plate. Cresy, in his book, illustrates a similar device to the last, also calling it a "hedgehog." He also describes a machine called a "floating clough" which was used to scour the river bed. This appears to have been a heavy timber frame 12-ft. long by 2-ft. wide by 6-ft. deep, with a serrated cutting edge on the downstream face. The "clough" was sunk to the bottom of the river at half ebb and was allowed to drift along the river bed until full ebb. While drifting, the cutting edges stirred up the mud. This machine was used in the river at Great Grimsby and also in the Humber. On these works, the spoil disturbed is said to have been carried three miles downstream in two hours. Knight describes and also gives an illustration of a dredger used on the Mississippi to maintain a channel through the mud banks. This dredger which was 154-ft. 8-in. long and 23-ft. beam, was provided with a three-bladed propeller 12-ft. diameter by 14-ft. pitch for propelling purposes and one 14-ft. diameter with six blades, forward which served a double purpose in assisting to impel the dredger forward and at the same time stirring up mud which was then carried away by the stream. This dredger was also provided with a scoop, half circular in section, 12-ft. deep and 20-ft. long. The scoop was suspended from davits at the forward end of the dredger, and was operated by lowering it into the mud bank, into which it sank by means of its own weight, and setting the six-bladed

(Continued on page 105)

Hsinking, Capital of Manchoukuo

By HAJIME MIURA, Chairman, The Hsinking Chamber of Commerce and Industry

HSINKING lies in the heart of Manchoukuo, 704 km. north-west of the port of Dairen and 240 kilometers south of Harbin. It is at north latitude 43° 15' and east longitude 125° 18'. Its terrain rises 214 meters above sea-level.

The city is situated in the midst of a vast undulating plain, in a region where the southern tributaries of the Sungari River begin their northward journey. The only peaks visible from the city are the unobtrusive Shihpeiling mountains far to the south-east. The Itung River which wends its way northward on the eastern part of the city is the only "river-like" body passing through the city. Its inadequate volume of water which is, moreover, completely frozen in winter precludes it as a medium of transportation.

The climate is continental, having a hot summer and an extremely cold winter. During July when the summer weather is hottest, it is not uncommon to witness, at mid-day, a temperature of 34°C. This, however, is mitigated by the dry atmosphere and invariable drop of temperature during the night. Autumn is suddenly ushered in at the end of August and shifted abruptly by the middle of October. Henceforward until the middle of April of the following year, winter reigns with a frigid grip, dipping the mercury column to as low as 35°C below zero. The bitterness of winter is somewhat alleviated by the cyclic recurrence of three cold days and four mild days. The first warmth, though slight, is perceptible in March, but it is not until the beginning of May that green foliages make their first appearance. Spring is delightful while it lasts, but before the end of June, the season is again dominated by the summer spell.

The months of April and May are the windy period. During this period when the wind is most violent, the entire city is enveloped by a dense canopy of brown dust which virtually darkens the heaven. In winter, the sky is limpid-blue and gales are rare.

The first rain of the year starts falling in the latter part of March. The rainy season of Hsinking are June, July and August. In these three months, over 70 per cent of the total annual rainfall is registered. The rainfall here is characterized by the suddenness and frequency of heavy showers. Literally like a bolt from the blue, a clear, blue sky is darkened in an instant with ominous clouds and followed almost immediately by a torrential shower. Its duration is as short as it is sudden.

Snow starts falling from the early part of November, but on the whole the volume of snowfall is very light.

The following table is the average meteorological report calculated from data covering a period from 1909 to 1937:—

Month	Temp. C	Rainfall mm.	Rainy and/or Snowy Days	Clear Days
January ..	(—) 16.9	6.2	5	17
February ..	(—) 12.6	6.0	5	13
March ..	(—) 4.2	15.6	6	10
April ..	6.5	21.9	7	4
May ..	14.5	54.6	11	4
June ..	20.1	121.5	15	3

Month	Temp. C	Rainfall mm.	Rainy and/or Snowy Days	Clear Days
August ..	21.9	137.7	13	5
July ..	23.5	177.7	16	2
September ..	15.0	57.3	10	9
October ..	6.7	38.7	8	12
November ..	4.2	17.3	6	12
December ..	(—) 13.7	6.7	5	16

Origin and Development

What is now the city of Hsinking was a century and half ago a desolate grazing area. The first form of community was established seven kilometers north of the present city at Changchunpu by the Hans. The pioneer settlers of Hsinking were farmers from north China who migrated into this country when the place was opened to settlement by the Ching dynasty in 1791. The virgin lands attracted a greater number of settlers each year because of their fertility. In 1825, a provincial office was established within the present site of Hsinking. Changchun, as the place subsequently became known, soon grew into a sizable town.

To protect the place from the ravages of brigandage then rampant, a huge wall and moat were constructed to encircle the town in 1865, by voluntary contributions of the inhabitants. Unlike the typical checkered Manchurian city, the walled town of Changchun was laid out into an unorthodox nonagonal shape. The wall had four large gates at the cardinal points and four small gates between these points. In addition to these, there was an equestrian gate, making the total nine. Today, all the gates except the east gate are gone



Hsin-jen Avenue in Hsinking

and hardly a vantage of the encircling wall remains.

The economic importance of Hsinking came into prominence for the first time when the southern terminus of the Chinese Eastern Railway was extended from Harbin by Russia to Kuanchengtzu, now a portion of Hsinking lying on the northwestern section of the city. Hsinking became further conspicuous when the railway line was stretched to Dairen, thus converting Hsinking into a pivotal junction. After the completion of these railway projects, the city witnessed a brisk increase of population so that by 1900, its population surpassed the 70,000 level.

As a result of the Russo-Japanese War, the ownership of the railway running south of Kuanchengtzu to Dairen was transferred to Japan by the Portsmouth Treaty in 1905. The S.M.R. was subsequently established to manage the line. The efficiency and progressive activities of the S.M.R. gave added impetus to the growth of the city.

Changchun became especially famous as the City of Beans in which staple product it was once the large marketing and distributing center of the country. However, with the close of the World War and the subsequent world-wide depression, the city slumped into a dormant state. The tyrannical oppression and extortion inflicted upon the populace by the war-lords controlling the area added further plight to the city.

With the foundation of the new State of Manchoukuo in 1932 as a result of the Manchurian Incident, the city was finally able to extricate itself from the impeding elements. The city was renamed Hsinking when it was selected as the site of the capital of the new State. After that, it witnessed a phenomenal growth and progress parallel with the sound development of the new State. In less than seven years, the population has almost quadrupled. Hsinking has become indisputedly the political, cultural and economic center of Manchoukuo.

Hsinking to-day enfolds an area of 437.65 sq. km. and has a population of 411,754 according to the latest census. It enjoys the status of a Special Municipality and stands on equal footing, administratively, with a province, the largest unit of division of Manchoukuo.

The city is divided into 12 urban wards and six rural wards. The urban wards have a total area of 111.48 sq. kilometers with a population constituting over 85 per cent of that of the entire city. The rural wards have a total area of 326.17 sq. kilometers or roughly thrice that of the urban wards. They are composed of scattered agrarian villages with considerable room for development. They are in fact being reserved for future extension of the urbanized area.

According to the census of June, 1939, the population of Hsinking is composed of the following racial groups:—

		Male	Female	Total
Manchurian	.. ..	181,178	114,049	295,227
Japanese	.. ..	49,122	39,321	88,443
Korean	.. ..	6,637	4,595	11,232
Others	.. ..	482	471	953
Total	.. ..	237,419	158,436	395,855

Capital Construction

The capital construction plan of Hsinking was first drawn up in March, 1933, by the National Capital Construction Bureau which was established by the Government to guide and supervise the building projects of the city, both public and private. To prevent future encumbrance from creeping up in the course of development and expansion of the city, a far-sighted and ambitious plan was adopted. The point worthy of note about the plan is that instead of first attempting to reshape and doctor the existing city, it calls for the construction of an entirely new city in the spacious virgin area adjacent to the old city as the basic and initial enterprise of the building scheme. The plan further provides for the future growth of the city into a metropolis of 1,000,000. It does not, however, aim to make immensity the ideal goal but rather stresses the necessity of creating a city most appropriate to the dignity of a national capital, capable of accommodating the political, economic and cultural quarters of the nation, and conducive to the health and spirit of the inhabitants.

The first project fixed upon by the National Capital Construction Bureau affected an area of 100 sq. km. in which the development was regarded most pressing and important. The 100 sq. kilometers area has been allocated for the following purposes and in the following proportions:—

Official and Public use:

Area for Govt. bldgs. and public institution	.. ..	11 sq. km.	55%
Area for roads and squares	.. ..	22 sq. km.	55%
Area for parks and athletic fields	.. ..	13 sq. km.	55%
Area for military use	.. ..	9 sq. km.	55%

Private use:

Residential area	.. ..	28 sq. km.	
Area for commercial purpose	.. ..	11 sq. km.	45%
Area for industrial purpose	.. ..	6 sq. km.	45%

As a first stage program in the execution of the plan, a Five-Year Project was launched by the Construction Bureau which undertook to develop 21.4 sq. km. of the new area at an estimated



State Council Building in Hsinking

cost of Y34,000,000. This expenditure was to be borne by the National Treasury under its special accounts section. The actual work on the project was begun in March, 1933, and completed in December, 1937, without any serious alteration or hitch to the original plan. The 21.4 sq. km. area completed under the Five-Year Project was devoted for the following purposes:—

Official and Public use:

Area for Govt. and public bldgs.	..	3.1 sq. km.	14%
Area for streets and squares	..	4.9 sq. km.	23%
Area for parks and athletic fields	..	2.8 sq. km.	13%

Private use:

Residential area	.. ..	5.9 sq. km.	28%
Area for commercial purpose	.. ..	2.2 sq. km.	10%
Area for industrial purpose	.. ..	2.5 sq. km.	12%

How well the Five-Year Project was executed can be best realized by seeing in person the newly built section of the city where stands to-day an array of modern edifices, broad thoroughfares, numerous well planned parks and squares that would compare well with the most modern of occidental cities. The feat is all the more amazing when one considers the fact that less than eight years ago, the place was nothing but a drab plain.

With the completion of the first stage program, the National Capital Construction Bureau was reorganized in December, 1937, and renamed the Provisional Capital Construction Bureau; while its control, which was formerly under the Central Government, has been placed under the jurisdiction of the Hsinking Special Municipality. A second stage program requiring an expenditure of Y6,132,997 and embracing a period of three years beginning from 1938 was initiated. This three-Year Project is again to be borne by the National Treasury under its special accounts section. The second stage program chiefly aims to modernize the old section of the city so that it may fall in line with the standard of the new section from which it lags far behind at present.

Street Construction

The fact that more than 21 per cent of the capital construction area has been devoted to street construction is due to the fact that great importance is being placed in this phase of the project for the development of the new area. Spacious boulevards, huge rotary squares and radiating highways to-day present a striking picture even to those foreign visitors accustomed to the sights of excellent highways.

The streets constructed in the planned area are divided in three classes, namely, main (60 to 26 meters wide), secondary (18 to 10 meters wide), and auxiliary (less than ten meters wide). The main and secondary streets have a central lane for motor vehicles, a slow traffic lane on each side of the central lane, and side walks. The boundaries between the motor lane, slow vehicle lanes and side walks are usually lined with rows of trees bedded with Kentucky blue grass. Rotary squares built at most of the main



Tatung Circle in Hsinking

street intersections greatly enhance the beauty of the streets by introducing graceful curves to the cubically aligned streets.

Water Supply System

Aware of the danger of water famines encountered in former days in this district, the authorities concerned took it as a matter of grave importance to assure the city of sufficient water. As a result of a thorough investigation for potential water supply sources, the subterranean strata of Hsinking were found to contain a considerable quantity of water. To utilize this source, twenty wells were sunk in different parts of the city which yielded 11,000 cubic meters of water daily. This was quite sufficient to suffice the need at the time. But with the further growth of the city, other sources of water capable of yielding larger quantities became necessary. A plan was finally drawn up and approved which called for the construction of a reservoir by damming the Hsiao and Tai Rivers, tributaries of the Itung River, capable of supplying an ample volume of water for a population of 500,000. The sum of Y3,500,000 was appropriated for the project on a two-year construction basis. Work was started on the reservoir in 1933, and completed as scheduled. Though capable of supplying 40,000 cubic meters of water daily, the volume has been cut down to the 20,000 cubic meter capacity of the filtration plant at Nanrin. As this volume plus the auxiliary subterranean supply are far in excess of present water requirements, Hsinking is assured of an abundant water supply for many years to come.

The construction of water mains was started in 1933 and to date 202 km. of pipe lines have been laid down throughout the city. In addition, 735 fire hydrants were placed in various parts of the city.

Sewage Disposal System

Taking into consideration the topographical features of the city, the sewage disposal system has been divided into nine independent sections which in turn have been subdivided into over 50 branch systems as tributary or converging lines. Before the new sewage project was laid down there were only two limited areas which had sewage disposal systems. To-day, almost every part of the city has a network of sewage lines which in all extend to a length of 302,031 meters, covering an area of 9,490,000 sq.m.

Subway Construction

The construction of tramways has been excluded from the Capital Construction Plan in view of the noise and disfiguring effects created by tramways and their vulnerability to air raids. In place of tramways, subways are to be constructed under the main traffic lanes of the city.

According to geological tests conducted by subway experts from Japan, the subsoil conditions in Hsinking have been found exceedingly favorable to subway construction. Hence, the actual construction project will be launched within the near future.

The lack of river transportation facilities in Hsinking is more than made up by the ample and efficient railway transportation systems. Hsinking is an important junction of the following railways which are the vital arteries of Manchoukuo:—

Dairen-Hsinking Line Hsinking-Tumen Line
Hsinking-Harbin Line Hsinking-Paichentzu Line

With the super express train "Asia," passengers from the port of Dairen can reach Hsinking in 8½ hours and from Hsinking to Harbin in 3½ hours.

In aerial transportation, Hsinking is connected with the various important points of Manchoukuo, China and Korea by the services of the Manchuria Air Transport Company and the Japan Air Transport Company. The latter will link Hsinking and Tokyo direct with a non-stop air route in the near future.

The Economic Phase

Hsinking is undoubtedly the economic hub of Manchoukuo. The majority of the so-called national policy companies which enjoy a special or semi-special status have their headquarters in Hsinking, which by its nature as national capital and its centrally located position, affords great convenience to these establishments in maintaining the necessary contact with the Government as well as with the other districts in which their spheres of interest extend. The companies are in close touch with the Government, collaborating with it in the prosecution of controlled economy. The present striking growth of Hsinking is attributable to a large extent to the growing tendency to concentrate the national policy companies here. To date, there are a total of 31 Special Companies and 18 Semi-Special Companies in Manchoukuo. Of these, as many as 24 Special Companies with an aggregate capital of Y1,090,000,000 and 12 Semi-Special Companies with a total investment of Y283,800,000 have their head offices in Hsinking.

A Five-Year Plan which aims to put the essential industries of Manchoukuo on a self-sufficiency basis was launched in 1937 with a fresh outlay of capital, totalling Y2,504,000,000. This sum, according to the Plan, was allotted for the following purposes:—

Mining Industry	.. .. .	Y1,391,000,000
Agriculture	.. .. .	122,000,000
Transportation and Communication	.. .. .	720,000,000
Immigration	.. .. .	274,000,000

However, the China Incident and the recent tense international development necessitated a modification of the Plan. In addition to the original aim, the Plan had to be enlarged to be in tune with the gigantic Four-Year Production Expansion Plan of Japan as well as take into consideration the position of North China for the creation of a harmonious, economic bloc and thus establish a new order in the Orient. After taking into account the actual progress made so far by the first Plan, the project has been converted into a revised Five-Year Plan, approximately doubling the outlay of capital to Y4,900,000,000 to increase the scale and tempo of the development in every branch of the project. However, special emphasis has been placed in the development of the iron, coal, electric, coal liquefaction, automobile and aircraft industries, whereas in the agricultural development, the Plan, while giving due consideration to the actual agrarian economic condition, aims to maintain a stable output in the essential staple products.

For the execution of the Plan, the Government established a Planning Board, and by promulgation, created five committees, namely, the industrial, control, exchange, foreign trade, commodity price and mobilization committees.

To further brace up the Five-Year Plan, the Law for controlling Important Industries was enacted in 1937. This new enactment places on the Government extensive powers of control over the Special and Semi-Special Companies, but in actual practice these companies enjoy an almost unfettered freedom of action in the pursuit of their enterprises, which can be interpreted as evidence of the smooth functioning of the new economic policy of the Government.

The seriously tampered currency of Manchuria before the inauguration of the new Government of Manchoukuo was a cancerous spot in the economic life of the country. To remove this impediment after the expulsion of the sponging military régime, the new State immediately undertook as a matter of urgent necessity the adjustment and control of currency by stabilizing the monetary system, unifying notes, adjusting old notes, and controlling monetary organs throughout the country. The Central Bank of Manchu was established in Hsinking in 1932 to shoulder the brunt of this stupendous task. In 1935, the Industrial Bank of Manchu was established to accommodate, among other things, the financial requirements of industrial concerns as well as the need for long-term credits. These two banking houses constitute the two largest banking institutions of Manchoukuo. Almost as widely influential but smaller in scale and created to meet the need of the poorer classes is the unique, Government-sanctioned financial institution, the Tahsing Konsu. It is singular in that one of its most important functions is the granting of loans to the needy by means of pawn transactions on a very low interest rate with a relatively long term of maturity. Besides the three, there are numerous other banks and related institutions with either headquarters or branches here to make Hsinking the leading banking center of the nation.

The undeniably sound monetary system and healthy economic outlook of the country, to-day, reflect to the signal success of the Government's economic and financial policies.

Commerce

Hsinking first sprang into prominence commercially when in 1908 Manchurian soya beans exported from this city were recognized for their economic value in the markets of Europe. At the height of its prosperity in 1920 when soya beans were exported from Hsinking to the amount of 688,000 tons, the city ranked topmost in Manchuria and fittingly won for itself the title of "The City of Beans." But to-day the city has slumped into insignificance so far as soya beans are concerned, exporting now but a small fraction of its former amount. This decline, as previously mentioned, was first due to the effect of the agrarian plight here, and to the irresponsible attitude of the military régime. The later continual decline, however, can be traced to the fact that the development of railway facilities further inland from Hsinking since the establishment of Manchoukuo has tended to decentralize the soya bean markets which were formerly concentrated in this city.

Next to soya beans in importance came lumber which was once a large item of export here, but with the establishment and development of Manchoukuo and the subsequent huge demand for lumber within the country, this once item of export has become an item of import to-day. Maize, millet and buckwheat can be cited as other important export items.

The chief imports are cotton textiles, sugar, marine products, fruits, pottery and sundries. Lately, building materials and machinery have also become important items.

Exports to and imports from Japan constitute by far the largest portion of the total foreign trade of Hsinking. Following Japan in the order of importance for their importation of Hsinking products are Germany, Great Britain and the U.S.A. The countries ranking after Japan for exports to Hsinking are Great Britain, the U.S.A. and Germany.

The industrial development of a city is, needless to say, not an accidental process. It depends fundamentally upon the inherent nature of the environment of the city, and upon the initiative, ability, and efforts of the inhabitants. Hsinking was unfortunate in respect to the latter human factors which were no doubt throttled by the lack of real order and feeling of security here in the past. Hence, though blessed with forest, agricultural and livestock products for the development of manufacturing industries dependent upon these materials, Hsinking was not able to develop, up until recently, further than as a purely local requirement manufacturing center. But with the birth of the state of Manchoukuo and the establishment of the national capital in Hsinking and the consequent stabilizing effect, the city began bustling with a new spirit



Kodama Park in Hsinking

of vitality, giving rise to new industrial enterprises on a more ambitious scale than hitherto undertaken.

During the days when this city was known as Changchun, there were three major industries here. They were the brewing, oil extracting (vegetable), and soya bean processing industries. All three to-day have declined into comparative unimportance. Flour milling and tobacco manufacturing are the two industries which have leaped into prominence lately. There are also in Hsinking such industries as rice polishing, weaving, lumber, match, brick, soap, candle, and metal ware manufactures, all on rather small scales, but with a promising future for expansion by virtue of the propinquity of the city to a rich farming belt containing a population of about 5,000,000 inhabitants.

What will be, when completed, one of the largest hydro-electric, power dams in the world is now under construction on the Sungari River at a point near the city of Kirin. The dam construction was started in 1936, on a five-year basis at an estimated cost of Y150,000,000 by the Government. It will have a 600,000 kilowatt-hour capacity electric plant when fully completed. According to the project, the generated power will be distributed to as far as Mukden and Harbin. As Hsinking lies within 130 kilometers from the dam, it will be in an easily accessible sphere of the distribution. This will make available cheap and abundant electricity here. The future therefore holds much in store for the industrial development of Hsinking.

Government of Manchoukuo

The Government of Manchoukuo is based on a constitutional monarchy. The sovereign head of the State is the Emperor who is vested by the Organic Law with powers of control over the executive, legislative, and judicial branches of the Government and is the supreme commander of the Army and Navy. The Privy Council is the advisory organ to the Emperor in matters affecting the State.

The Legislative Council is a body that may be ascribed as the Upper House in a bicameral system. Among its chief duties are the endorsement of laws, budgets, and agreements.

The State Council forms the nucleus of the Government. It is the center of administration, and has, as its executive head, the Prime Minister, who is the highest representative of the Emperor in State affairs. There are six departments under the jurisdiction of the State Council, namely, the Departments of Public Peace, People's Welfare, Justice, Industry, Economics, and Communication. Each Department is presided by a Minister. Also under the State Council are the General Affairs Board, the Foreign Office, and various other bodies relating to administrative matters. The General Affairs Board has the vital rôle of formulating Government policies and co-ordinating the functions of the various Departments and Bureaus.

Hsinking Special Municipality

With the abolition of extraterritoriality in Manchoukuo and the transfer of the S.M.R. Special Railway Zone to the Government, (Continued on page 102)

Japan's Mining Output and the Coal Shortage

In line with the Government's general policy providing for maximum self-sufficiency in basic industrial materials, the Cabinet Planning Board late in 1938 adopted a productivity expansion program in which non-ferrous metals and coal were among leading factors.

A program announced in the Diet by Mr. Kazuo Aoki, who at that time was president of the board, provided for increased production by the end of 1941 over the 1938 output of more than 100 per cent for gold, over 900 per cent for magnesium, over 80 per cent for copper, 90 per cent for lead, 70 per cent for zinc, 200 per cent for tin and 30 per cent for coal.

Early in March, 1939, the Government announced a new five-year plan calling for production increases by 1942 over output for 1939 for the so-called Far Eastern bloc including Japan, Manchoukuo and China of 1,000 per cent for magnesium, 80 per cent for copper, 90 per cent for lead, 70 per cent for zinc, 100 per cent for tin, 20 per cent for gold, several times the production of aluminum and 30 per cent for coal.

As the mining and metal industry suffered in the general shortage of coal and electric power during the second half of 1939, it is believed that it has been impossible to fulfil the ambitious production schedules for the past year, although the ban on publication of figures makes it impossible to know how far short the program fell. During the middle of 1939 the Government enforced a law for protection of military secrets applying to statistics on the importation and production of aluminum, bauxite, magnesium, nickel, ferro-nickel, mercury, manganese ore, ferro-manganese, cobalts, ferro-vanadium and aluminum alloys.

The mining and metal industry further was handicapped by the outbreak of the European war, as a result of which aluminum and nickel producers faced a sharp rise in production costs because of the increase in freight rates. The bulk of ores required for the manufacture of these metals is secured from foreign countries. It was reported that the production expansion program might be restricted because of the cessation of imported equipment from Germany, certain orders for which were outstanding at the outbreak of the war.

The sharp rise in world quotations had a depressing effect on industries depending on foreign sources, and it was

said that activities of munitions and other heavy industries may have to be curtailed to some extent if such supplies as aluminum, nickel, copper, tin and lead are cut off as a result of embargoes by principal suppliers. Optimism was expressed for the lead, zinc and mercury industries, but the basis for such an outlook was not indicated.

The immediate effect of the European war on the industry as a whole, however, was to accelerate production expansion plans which can be carried out without foreign equipment and ores.

Control Intensified

The production expansion program adopted by the Government was accompanied by increasing Government control and regulation of the mining and metal industry. Two important pieces of legislation were adopted by the 74th session of the Diet in 1939. They were the Light Metal Manufacturing Industry Control Law, which became effective June 1, 1939, and the law establishing the Imperial Mining Development Company. A third law provided regulations of the Japan Gold Producing Development Company.

The Light Metals Manufacturing Industrial Control Law provides that all light metal manufacturing concerns having an annual production of more than 1,500 metric tons of aluminum, 3,000 tons of alumina and 300 tons of magnesium are to be subject to official control. Firms licensed in accordance with the law include nine producers of aluminum, one of alumina and four of magnesium.

The Imperial Mining Development Company, a semi-official organization capitalized equally at ¥30,000,000 by the Government and private interests, is to exploit mines now being developed and to develop new mines for copper, zinc, lead, nickel, tin, cobalt, manganese, tungsten, mercury and antimony. Its activities are to be limited to Japan Proper and it will not engage in gold production. The company is to manage the production and refinement of principal mineral products, to distribute ores to domestic refiners and to make loans to medium-sized and small mining companies.

As the semi-government control company is to distribute allotments of ores, the prevailing system of concentrating importation and distribution of ores in such associations as the Japan Copper Control Company and the lead, zinc and tin

PRODUCTION OF NON-FERROUS METALS IN JAPAN

GOLD					
(In kilograms)					
Years		Japan Proper	Korea	Formosa	Total
1931	..	12,275	9,031	553	21,860
1932	..	12,497	9,700	817	23,014
1933	..	13,728	11,508	652	25,888
1934	..	15,146	12,427	1,046	28,620
1935	..	18,321	14,710	1,157	34,189
1936	..	22,234	17,489	—	—

COPPER					
(In metric tons)					
Years		Production	Imports	Total supply	Exports
1932	..	70,646	296	78,031	2,767
1933	..	69,120	13,326	85,539	153
1934	..	66,490	46,991	116,353	1,090
1935	..	69,407	65,261	137,441	694
1936	..	78,614	47,794	129,607	7

LEAD			
(In metric tons)			
Years		Production	Imports
1933	..	6,825	67,255
1934	..	7,039	95,114
1935	..	7,442	91,408
1936	..	8,224	97,822

ZINC			
(In metric tons)			
Years		Production	Imports
1933	..	30,658	32,526
1934	..	32,145	33,208
1935	..	34,191	45,843
1936	..	39,320	61,774

TIN			
(In metric tons)			
Years		Demand	Imports
1933	..	4,490	965
1934	..	5,299	1,218
1935	..	6,439	2,069
1936	..	6,529	1,904

ALUMINUM				
(In metric tons)				
Years		Production	Imports	Exports
1934	..	664	10,175	347
1935	..	4,434	13,401	1,018
1936	..	6,664	10,241	872

control associations is to be abolished. Trade associations will act only in an advisory capacity regarding price for imported ores and for selling prices of domestic non-ferrous metals.

It was reported that the Imperial Mining Development Company is to take over smelting of all imported copper ores. This was considered preliminary to general unified control of non-ferrous minerals and metals produced by the development company itself. These regulations were scheduled to go into effect during the early part of 1940.

Gold legislation provides for expenditures of about ¥28,000,000 to subsidize and encourage gold production, to aid prospectors and to train technicians. The Extraordinary Capital Control Law also was revised for the purpose of providing capital for major industries and early in 1939 the Japan Light Metal Company was established with a capitalization of ¥100,000,000 for increasing production of aluminum.

On November 11, 1939, the Government introduced a new gold purchase premium system to encourage increased production of gold. Because of a decline in the value of the yen, there was a difference of about 89 sen per gram between the gold purchase price of the Japanese Government and the world market price. A Commerce and Industry Ministry statement said the Government decided against passing this profit on to the general public in favor of a plan to encourage increased output by a system of premium payments on increased production. According to this plan, ¥2 per gram will be given to mine operators who achieve production increases over quotas established by the Finance Ministry. It was reported that plans to increase production of gold during the first half of 1939 failed, as a result of which these efforts to stimulate production were adopted.

Continued Government support for domestic nickel and aluminum industries was assured by the Commerce and Industry Ministry, which plans to spend ¥1,000,000 in subsidies for aluminum producers for the fiscal year 1940-41 and ¥230,000 for nickel producers.

Because of Japan's dependence on foreign sources of supply for the bulk of non-ferrous metals consumed by domestic industries, a sharp rise in prices for most metals is considered inevitable. The Ferro-Alloy Council applied for permission to advance the price of molybdenum and vanadium by from 30 to 50 per cent. Official approval was given for a 20 per cent increase in the prices of copper effective December 1, 1939.

Domestic producers asked the Commerce and Industry Ministry to advance prices of electro-copper from ¥107 to ¥135 per 100 kilograms, lead from ¥36 to ¥48, electro-zinc from ¥54 to ¥61, distilled zinc from ¥47 to ¥54, antimony from ¥125 to ¥135 and No. 1 tin from ¥410 to ¥420. The Government, however, sought to cut prices for important war materials. Producers of aluminum and duraluminum were ordered to reduce prices of their products in order to cut the price of warplanes for the army and navy. The army reportedly asked for a reduction of ¥200 per ton for aluminum, but this was opposed on the grounds the domestic production would suffer. A compromise therefore was reached providing for a reduction by ¥200 from ¥2,300 per ton to ¥2,100.

Despite domestic and foreign obstacles, a number of companies reported progress in their production expansion programs. The Japan Aluminum Company completed the first stage of a production schedule calling for 6,000 metric tons and plans soon to start on the second stage of its expansion program with two plants of 4,000 ton capacity and one of 8,000 tons. The company also intends to erect an alumina plant with an annual capacity of 16,000 tons and a magnesium plant with an annual capacity of 300 tons.

It was reported that in 1939 the industry could supply but 50 per cent of the demand, which was estimated as being between 35,000 and 40,000 tons. The domestic supply is said to have increased to 18,000 tons from 10,000 tons in 1937, the rest of the supplies presumably being imported.

Because of a shortage of ferro-manganese, the Commerce and Industry Ministry decided to encourage domestic production by permitting a 20 per cent increase in the volume of imported manganese ore. To improve their organization in the production of ferro-manganese, the Showa Iron Manufacturing Company and the Showa Iron Manufacturing and Mining Company decided to merge interests and to undertake production in a new plant which is being built. The new organization plans an annual output of 5,000 tons.

The increase in the demand for nickel during the last two years is reported to have risen from around 3,000 tons to 10,000 tons. To meet still greater demands in the near future, the Japan Nickel Company plans an annual production of 15,000 tons and has announced an expansion program calling for an output of 50,000 tons. In accordance with the Government's plan to encourage the development of domestic deposits, the Commerce and Industry Ministry was given an appropriation of ¥230,000 for subsidizing in 1939 the production of nickel from Japanese ores. Attention also is being given to the development by Japanese capital of foreign ores. The Sumitomo and Mitsubishi interests recently completed a survey of nickel deposits in Brazil which they plan to exploit. The Kamogawa Nickel Company has decided to establish a ¥10,000,000 independent organization and to erect a plant with an annual capacity of 1,000 metric tons for pure nickel.

To increase production in the yen bloc, the Manchurian Mining Development Company is to extend technical and capital support to the South Manchurian Mining Company for the development of magnesite resources at Taishihchiao on a large scale. It is also reported that Japanese firms plan to exploit non-ferrous mineral resources in parts of China under Japanese control. A trade report states that the Japanese Antimony Producers Association has secured permission to erect smelters in Wuchang as the first step of an extensive antimony smelting enterprise in Hupeh and Hunan Provinces and that regular shipments of bauxite will be received from Hainan Island in the near future.

New Discoveries Reported

Several discoveries of what are believed to be important deposits were also reported during the year. Prospectors recently announced the discovery of gold deposits in Formosa believed to be worth ¥1,000,000,000. Operations there started during the spring of 1940. New tungsten deposits have been found in Okayama Prefecture, while nickel ores of the Okayama mine of the Showa Mining Industrial Company have been found to contain .3 per cent cobalt. Mr. Kohei Hishida, of the Taito Mining Company, Osaka, is credited with the discovery of tungsten deposits covering an area of 197,000 tsubo near the village of Yamate, Tokubog-un, Okayama Prefecture. The Uchida Mining Company of Osaka has reported the location of another tungsten deposit covering an area of 335,000 tsubo near the village of Kawabe, Hibi-gun, also in Okayama. It is said to consist of seven main veins and several auxiliary veins extending for about a third of a mile.

The extent to which the mining industry made gains during the period following the outbreak of the China incident is not known, although production indices announced by the Commerce and Industry Ministry indicate that the Government is making some headway in its production expansion program. These indices are based on the average production of the years 1931, 1932 and 1933 and are weighted as follows: gold, 3; silver, 1; copper, 10; sulphur, 1; petroleum products, 2 and coal, 37. The index for May, 1938, is given as 162.9. In the following month it fell to 158 and in August to 148.3. In September it rose to 154.7 and made steady gains up to the end of the year, when the index stood at 177.4. In January, 1939, it fell again to 162.1, rose to 175.2 in March and then declined to 148 by August. Up to November it recovered to 171. The slump during the summer of 1939 is attributed to the shortages of coal and power, with the elimination of which the industry is expected to continue making gains.

One of the most serious problems facing the entire industrial system of the country is the scarcity of coal. The shortage has had far-reaching effects on industry because of the subsequent curtailment in electric power. Although Japan is poor in most resources, it has been known for ample supplies of coal. Up to 1938 its domestic production together with imports from Manchuria were enough to meet demands. But a severe shortage began during the early part of 1939. This was caused not by a fall in production, but by a sharp increase in demand with which coal producers failed to keep pace. As only a few years ago the country had been troubled by a surplus of coal, it was believed that it would be quite simple to increase domestic production. Because of a shortage of labor and materials, however, together with an unsatisfactory distribution system, sufficient supplies were not available for the market.

Although the amount of coal placed on the market in 1939 was greater than for the preceding year, it was far below the demands of the country. According to figures issued by the Coal Association, the total amount of fuel placed on the market between January and November, 1939, reached 39,744,669 metric tons, an increase of 971,523 metric tons over the preceding year. The amount of coal produced is believed to have been much greater, however, as the figure given by the association does not include supplies used by the Japan Iron and Steel Manufacturing Company and the Japanese navy. Publication of coal production figures have been prohibited.

Of the total amount of coal placed on the market between January and October, 1939, including supplies from Kyushu, the Hokkaido, Joban and Ube the Coal Association accounted for 26,938,737 tons and outside dealers accounted for 9,014,820 tons, making a total of 35,953,557 tons. In 1938, however, the association handled 27,904,625 tons of the total supply of 35,230,095 tons placed on the market between January and October. During the 1939 period, therefore, the amount of coal handled by the association declined by 965,888 metric tons while that by independent dealers increased 1,689,350 tons. For the 1938 period, the association accounted for 79.2 per cent of the supplies, while in 1939 it handled but 74.9 per cent, the difference having been taken over by non-association dealers.

Fuel of Poorer Quality

Despite gains made in the amount of coal placed on the market by independent dealers, their fuel was of an inferior quality, resulting in a loss of efficiency for industrial plants. Low grade fuel is but one of several reasons advanced to account for the disparity between the supply and demand of coal during 1939. The demand for coal by iron and steel manufacturers as well as by the chemical industry increased sharply. It became even more pressing when the shortage of hydro-electric power made it necessary for power plants to increase their consumption of coal and the demand for electric power, in turn, increased as a result of expansion of the mechanical industry.

The iron and steel manufacturing industry consumes the largest amount of coal, the chemical industry, railways, electric power, cement industry and foodstuffs enterprises coming next in order. In Manchoukuo the percentage of coal consumed by the iron and steel manufacturing industry is larger than that in Japan. The same holds for railways and industries requiring steam, while the consumption by the chemical and other industries in Manchoukuo is less than that in Japan. The percentages of coal consumption by various industries in Japan is given as follows: iron manufacturing, 21; industries requiring steam, 5; railways, 10; ceramics, 8; electric power, 10; chemical industry, 16; foodstuffs, 4; and others, 26. In Manchoukuo the respective figures are: 29, 26, 20, 8, 7, 5, 2 and 3.

Imports of coal from Japan's colonies decreased heavily during 1939, making the fuel shortage that much more severe. The amount of coal imported from Fushun for the period between January and October, 1939, totalled 622,738 metric tons, decreasing by 486,762 tons from the amount for the corresponding period of the previous year. Other coal imported from Manchuria amounted to 91,031 tons, decreasing by 341,766 tons. Formosan coal amounted to 52,830, falling by 108,323 tons. Kaiping coal, however, totalled 1,697,056 tons, increasing 235,300 tons over 1938.

Three reasons have been advanced to explain the failure of producers to keep pace with the demand for coal. First, reckless mining at coal pits for the last several years has begun to tell; second, materials and labor necessary for coal mines have become scarce, and finally, compulsory reduction in the price of coal in September, 1938, resulted in a drop in profits for companies belonging to the Coal Association, as a result of which they have lost some of their interest in coal mining.

The amount of coal placed on the market increased irregularly from 19,640,000 metric tons in 1912 to 45,258,000 tons in 1937. The coal output in Japan Proper for 1912 amounted to 19,000,000 metric tons, and increased to 31,000,000 tons in 1920 with the end of the World War. Following the war, the output declined in 1921 to 26,000,000 tons because of the business depression. It started to increase once more so that by 1929 production reached 34,000,000 tons. Another financial depression in 1930 resulted in a drop by 1931 to 27,000,000 metric tons. The industry at this

time suffered serious dislocations, the number of miners being reduced from the high total of 348,000 to about 140,000. With recovery setting in again in 1933, the coal output once more began to increase, reaching 45,000,000 metric tons by 1937, which means an annual production increase of about 3,500,000 tons.

This sharp increase was made possible by readjustment of pits during the depression period of 1931 and 1932. Although coal operators dismissed a large number of miners, many were retained to trim old pits and prepare new ones in anticipation of increased demands in the future. By the end of 1938, however, the resources of profitable mines were exhausted and few preparations had been made for extending production, as a result of which the amount of increase in coal output began to decline.

When the China incident broke out in 1937, a great many miners were called to the colors, most of them being young and efficient workers. As a result, mining operations at once were thrown into confusion. Discipline in coal pits, considered necessary for efficient operations, became lax. This handicap was made worse by the tendency of many workers to leave mines for more attractive positions in munitions factories.

At first, the Government failed to recognize the importance of the coal mining industry in relation to the wartime situation and emphasized the munitions industry. It issued orders to prefectural governments to provide preferential terms to induce workers to enter munitions plants. Fukuoka Prefecture, one of the largest coal producing centers was affected seriously by this movement. "To Munitions Factories" was the slogan of posters displayed everywhere. The desertion of the coal mines became so serious that operators appealed to the Government to consider the coal industry as being of as great importance as the munitions industry.

As coal output began to decrease, the Government became increasingly aware of the importance of fuel in the wartime economic situation. Finally in June, 1939, the Welfare Ministry issued instructions to prefectural governors to treat the coal mining industry with the same favors as munitions.

Another difficulty in securing adequate labor for coal mining arose when the Government placed under its control all hitherto independent employment offices. All jobs consequently had to be filled through Government employment agencies, as a result of which the traditional method of attracting labor into the mines through the medium of friends and personal acquaintances was hampered. The shortage of labor, therefore, has not yet been remedied, and workers continue to look to munitions plants as being the source of the fattest pay envelopes.

Coal operators consequently requested the Government to permit the use of female labor in their mines. Until recently, female and juvenile labor in mines was prohibited as a result of a decision of the International Labor Conference at Geneva. Because of the labor emergency, however, the Government sanctioned the use of female labor. Under a special ordinance, issued in August, 1939, the Welfare Ministry permitted women below 25 years of age to work in coal mines. At present there are between 2,000 and 3,000 women employed in coal mines and their number is expected to increase.

As their efficiency is low and much cannot be expected from them, coal operators next asked the Government to import Korean laborers. Although the Government again failed to accede to their request at first, the Welfare Ministry in August, 1939, permitted the immigration of Korean workers. As the labor situation in Korea was depressed because of the severe drought in 1939, many welcomed the opportunity to come to Japan. The number of Korean laborers in Japanese coal mines now is estimated at 20,000.

Materials Short

Scarcity of materials is still another factor hampering the output of coal. Here the coal industry suffered from the general shortage of supplies in the country. Safety lamps are considered absolutely necessary for miners; yet their supply is becoming very short. About 10 kinds of imported materials are necessary for manufacturing safety lamps, but the procedures for securing import permits are very slow and troublesome. In addition, iron, steel, carbide for illuminating purposes and rubber soles for miners' shoes also are short. According to an investigation by the Mutual Aid Society, organized by coal miners, the supply of iron and steel for the coal industry has decreased by 40 per cent from the amount prevailing before the incident and that of carbide

50 per cent. Although Japanese footgear can be substituted for rubber shoes, they lack durability, and the Government therefore has decided to increase the supply of rubber soles.

Wooden shacks also are needed for miners, but there is a shortage of nails necessary for their construction. For a small colony of miners, hospitals, schools, waterworks and other requirements must be supplied. These also have been affected by the shortage of materials. Although the Government seeks to meet the demands of the industry as far as possible, the prevailing shortage is nationwide and it is considered doubtful whether the demand can be met.

The price question is still another factor which has interfered with the smooth distribution and production of coal. In September, 1938, the Government forced producers to reduce the average price of coal ¥1.10 per metric ton. This action at the time was commended by the public as it conformed with the Government's low price policy. In practice, however, it failed, as it interfered with production. Profits of large coal mining companies suffered severely as a result of the price cut. The amount of coal placed on the market by medium-sized and small producers, however, increased because the price cut was forced upon operators belonging to the Coal Association while other operators were not affected.

While the price of coal was reduced, prices of other goods increased, resulting in a higher cost production. According to a report by the Mutual Aid Society, the production cost during the year between September, 1938, and August, 1939, increased by 26 per cent. On the basis of rates prevailing in September, 1938, the cost in October 20, 1939, of oils increased on an average by 21.7 per cent, pit timber 16.1, iron, 10.5, lumber 27.1, machines 32.8, electric apparatus 22.4, building expenses 31.5, wire rope 5.9, wages for workers in inside pits 26.5, for those in outside pits 19.8 and office expenses 52.7.

With the enforcement in 1939 of the so-called September 18 price level, an increase in the prices of coal produced by independent operators also was prohibited. Coal miners therefore frequently filed petitions with the Government seeking increases in the price of coal. Government officials were puzzled as to how to solve the dilemma. Finally they decided to circumvent the price issue by deciding to grant to operators subsidies involving ¥22,000,000 (amounting to about ¥4 per ton) to encourage an increase in production, ¥41,800,000 to indemnify losses and ¥16,800,000 (about ¥.35 per meter) for encouraging the development of new pits.

Distribution Inadequate

Lack of distribution efficiency was considered one of the principal reasons for the coal shortage. To remedy this, the Government decided to establish a coal distributing control company named the Japan Coal Sales Company through joint investment of Government and private funds. Despite caustic criticism against the proposal, the Diet passed a bill providing for establishment of the company. Members of the House of Representatives expressed doubt whether the Government would be able to increase the supply of coal by 6,000,000 tons by means of the company and pointed out that 37,000 additional miners would have to be recruited to accomplish its program.

The law incidental to establishment of the company contains the following provisions:

(1) All coal must be sold to the Japan Coal Sales Company except when it is to be used by producers and importers and in accordance with especial permission granted by the Commerce and Industry Ministry.

(2) The Japan Coal Sales Company will engage in business relating to the purchase and sale of coal, export and import of coal, lending funds to operators, investing in the industry and enterprises necessary for a smooth supply of coal and fixing appropriate prices.

Another principal cause of the shortage of coal in Japan was the considerable decline in imports from Manchuria. When Japan's five-year coal supply and demand plan was formulated, nine per cent of Japan's total supply was to be filled with imports from Manchuria, but in 1939 the amount of imports decreased sharply. The decline in imports is attributed to a heavy increase in the demand in Manchuria and a standstill in the production increase program for Fushun coal. In 1932 the total supply of Manchurian coal was 7,166,000 metric tons, 42 per cent of which was for domestic use and the rest for export. In the following year the supply was

9,081,000 tons, 49 per cent of which was consumed within the country. In 1934 the output totaled 11,113,000 tons, 58 per cent of which was used in the country, and in 1935 the supply was 12,368,000 tons, the domestic use of which increased to 64 per cent. In the following year production totaled 13,423,000 tons, domestic consumption again increasing to 71 per cent, and in 1937 the output was 14,460,000 tons, 76 per cent of which was used at home.

As the demand for coal in Manchuria has been increasing steadily, there resulted a regular decline in the amount of fuel available for export. Of the total export of Manchurian coal, Fushun coal accounted from 50 to 70 per cent. Recently, however, the output of Fushun coal has failed to increase. In 1933 6,846,000 tons of Fushun coal were placed on the market; in 1934 there were 7,520,000 tons; in 1935, 8,733,000 tons; in 1936, 9,592,000 tons and in 1937, 9,530,000 tons.

The Manchuria Coal Mining Company, which is controlled by the Government, however, is striving to increase the output of coal. Of the gain in total Manchurian coal production for 1937 and 1938, 90 per cent was accounted for by this company. If this company develops as planned, there again is expected to be an increasing amount of fuel available for Japan.

As the demand for coal in Japan, both for industrial and other purposes, is expected to develop a substantial expansion the Government is exerting every effort in its capacity to bring about an increase in production. Early last summer it was announced that the mining authorities were hoping to attain an increase in domestic output by at least 6,000,000 metric tons by resorting to various measures such as the granting of subsidies and other forms of encouragement to mine operators.

To expand the available amount of supply further, the Government has been endeavoring to bring about an increase in imports of coal from Saghalien and North China.

Hsinking, Capital of Manchoukuo

(Continued from page 98)

the Special Municipality Decree was enacted to elevate the status of Hsinking to befit its position as National Capital, while the Decree at the same time abolished the Special Municipality status of Harbin which that city formerly enjoyed.

The Hsinking Special Municipality is headed by a Mayor who is installed into office through appointment by the Central Government. A Consulting Committee consisting of 15 members appointed by the Mayor on an honorary basis constitutes the chief advisory organ to the Mayor with regard to the needs and conditions of the various wards of the city. The Mayor is assisted by a Deputy Mayor who has charge of the five departments of the Municipality, namely, the Secretariat, Administration Department, Sanitation Department, Finance Department, and Industrial Department.

Listed below are some of the chief social enterprises and public facilities managed by the Special Municipality.

(1) *Charity and Social Enterprises*

- (1) Home for the aged and orphans
- (2) Employment agency
- (3) Sanatorium
- (4) Municipal housing accommodations

(2) *Educational Institutions*

- (1) 31 primary schools (including one Russian and one Korean school)
- (2) Two Manchurian high schools for boys
- (3) One Manchurian high school for girls
- (4) One public library

(3) *Health and Recreation Facilities*

- (1) Seven parks
- (2) One combined athletic and recreation field
- (3) One special hospital for women
- (4) One contagious disease institution

(4) *Transportation Facilities*

Bus service (There are no tramways in Hsinking)

(5) *Marketing Facilities*

Central Wholesale Market

Progress of Industrial Research in the Philippines

Work is Undertaken by the Bureau of Science Under the U.S.
Supervised Commonwealth Government of the Philippines

By ADEUDATO J. AGBAYANI (*The Author is Editor and Publisher of the Ilocos Times, Manila, and is a Member of the American Association for the Advancement of Science*)

A NEW industrial era is dawning on the Philippines as the result of the recent industrial researches undertaken by the Bureau of Science, the scientific center of the Commonwealth of the Philippines, which is scheduled under an Act of the U.S. Congress to be politically independent in 1946. The Philippines, seventh biggest overseas purchaser of United States goods, is essentially an agricultural country. Her population is now over the 16,000,000 mark.

The finished experiments and tests reveal the tendency of the Philippine Government: to be self-sufficient. The researchers and scientists are quietly making local substitutes for some of the expensive manufactures being imported by the Philippines from foreign countries every year. The same government entity is also bending its efforts to find new uses of local products and wastes of present-day Philippine economy and to improve the present methods of manufacturing essential native Philippine goods for obvious reasons. The Commonwealth of the Philippines has its National Development Co. to start new industrial enterprises. Through the operation of its agencies, this Company realized a net gain of over one million dollars in 1939. Last year the National Development Co. placed an order for over two million dollars worth of raw products from the United States.

The engineering world will be glad to know, for instance, that the Philippine Bureau of Science has definitely made a Philippine counterpart of "Heraklith," universally known German building board, which, when properly applied on a building, gives the latter the appearance of solid concrete. Dr. Angel S. Arguelles, director of this scientific center, claims that the Filipino-made "Heraklith" is "much stronger and more rigid and durable" than the genuine "Heraklith" of Germany. And this is the secret: the Philippine "Heraklith" is made from native bamboo strips (long, thin, and narrow) soaked in resinoid varnish before they are put at random loosely in a hot press. The German "Heraklith," on the other hand, is manufactured from compressed shavings of pine wood. It has been observed that the Filipino-made, bamboo-resinoid "Heraklith" is very much cheaper than the imported products and with a coat of Philippine cement on one side this building board "becomes as hard and solid as cement concrete." Since the Philippine bamboo lasts a lifetime under ordinary conditions, it is inferred that the Filipino-made building board would last as long. The provinces of the Philippines could easily supply sufficient bamboos for the manufacture of Philippine "Heraklith" on a commercial scale. This product is ideal for acoustics and insulation projects.

In another direction where the experimentation is being undertaken for the purpose of improving the quality of the actual products of home industries, a process has been devised to produce a plasticized (plied) *sawali* (bamboo wall). By this treatment, the ordinary *sawali* features are improved inasmuch as the plied *sawali* has a smooth surface free from holes, fairly water-proof and highly resistant to the attack of destructive insects.

"Masonite" harboard, claimed to be "termite-proof and rot-resistant," is another foreign building material that has been used in fashionable homes, offices, and other edifices in the Philippines, particularly in Manila, of late. Investigations conducted by the Philippine Bureau of Science have shown conclusively that sawdust from Philippine woods like *Lauan* and *Apitong* when properly pressed with resinoid, would make a strong and beautiful wallboard that could compare favorably with the much advertised imported "Masonite." This attractive Philippine *Masonite* in some instances, is believed to be even stronger and harder than some of the leading hardwoods of this 7,083-islanded Archipelago. *Apitong* and *Lauan* are plentiful in the Philippines.

A very durable fire-proof roofing (plain or corrugated) material that is light, cool, inexpensive, and immune to rust is another new contribution of the Bureau of Science to improve the health of the

people, save money from imported galvanized iron sheets, and revolutionize the construction of the roof of Philippine homes. This new roofing material is made from Manila Paper, impregnated and pressed together and heated under pressure in the laboratories of the Bureau of Science. Besides giving relief and protection from tropical heat, the new roofing material could easily be put together by ordinary house builders. How this new roofing material will affect the manufacture of the universally known Manila Paper remains to be seen. Manila Paper comes usually from the Filipino plant "talahib." In announcing the success of the Philippine Bureau of Science in this direction, Director Arguelles has explained that such corrugated fiber roofing "will make an excellent substitute for G.I. and Nipa roofings." The framework of the roofs of Philippine woods need not be heavy because this new roofing material is light, in the opinion of the technicians of the Philippine Bureau of Science's chemical engineering staff. It is doubtful if the local scientists have ever considered the great possibilities of exporting that kind of roofing material to other tropical countries which need light and inexpensive building materials for the homes of their poor people. At this writing the Philippines is still the United States' best overseas buyer of galvanized steel sheets.

The day is fast dawning when the Philippines will substantially cut her importation from Europe (particularly Portugal and Spain) of the very useful material known as "corkboard," which has been widely used by the civilized world of late for inexpensive acoustics material for radio stations and motion picture studios or for the construction of refrigerated warehouses, hotels, cinema theaters and bars. As a substitute for that imported product, the Bureau of Science has succeeded in making "coconut coir-pulp board" which has better heat insulating properties than the imported corkboard. It was also found by the Bureau of Science that the former "is fairly water-proof, vermin-proof, and fire-retarding." Coming as it does from the coconut husk, the native coconut coir-pulp is manufactured through the resinoid process. Compared with the insulation boards from foreign countries, the "Made-in-the-Philippines" insulating board, in air-conditioning and refrigerating, "has a lower coefficient of thermal conductivity."

Has the Philippines the strongest plywood or veneer in the world? To this question, a member of the technical staff of the Bureau of Science, has this illuminating eye-opener:

"We have in the Bureau of Science plywoods and veneers that stood thirteen and one-half hours in boiling water and soaked for 2,150 hours. No imported plywood or veneer can stand ten hours of boiling or twenty days in water. Japanese plywood falls apart when soaked overnight in water. This shows the great possibilities of plywood and veneer industry in the country. Local woods are much in demand abroad. At present the Philippines is satisfied with shipping them to foreign countries and getting whatever it can for its lumber. Foreign countries in turn convert Philippine lumber into plywood, veneers and other products and make fortunes out of them. Philippine abaca undergoes the same processes, which Japan and other highly industrialized countries will never tolerate. Why, we can manufacture plywood here so cheap that the average Filipino would be able to put up a more decent and comfortable house than his present abode. Plywood manufacture would at the same time solve the Philippine forest problem."

The investigation conducted by the technicians of the Bureau of Science as regards the possibility of manufacturing cement-asbestos boards and roofing material has reached a stage that now calls for its production on a commercial basis. Likewise the Bureau of Science has succeeded in working out an economical and quick method of manufacturing vinegar from sweet potatoes.

(Continued on page 105)

Oil Resources in the South Seas

(Bulletin of The South Sea Association)

THE oil resources of East Asia are of two distinct fields. One is the oil zone coursing the eastern and southern sides of the Asiatic Continent, covering Karafuto and other islands of Japan, the Philippine Archipelago, the Dutch East Indies, inclusive of Borneo, Sumatra and Java, Burma, the foot of the Himalayas in India, Persia and Mesopotamia. This zone belongs to the Tertiary formation.

The other oil source is scattered over the interior of the continent, including the oil-field in the basin at Pashu, west of Chungking in Szechuen, in China, the one in Manchoukuo, and the one at Dalai in eastern Mongolia. This oil zone belongs to the Mesozoic formation.

There is no comparison, however, between the former and the latter in point of output. For the former produces 99 per cent of the entire output of petroleum in Asia. The latter, however, has special characteristics in that this oil zone contains coal deposits.

It is said that Szechuen and Shansi have produced petroleum from olden times. It is also said that the Chinese term for petroleum, which consists of two ideographs, one corresponding to the English word stone and the other to oil, came from Shansi Province where it was first used. Even from this it may be inferred that the oil zone in the interior of the Asiatic Continent should not be dismissed lightly. For instance, the oilfield at Fuhsin, in Manchoukuo, was discovered by mere accident. From this experience, it is conjectured that new fields may yet be found at other places in that region.

Next, if the oil resources in the South Seas are examined, it comes to light that this oil has one outstanding characteristic. It is that strata, which are older than the Mesozoic formation and do not produce petroleum, extend on both sides of the oil zone which runs from Burma to Java through Sumatra. From these older layers are produced granite which contains a rich proportion of tin. This region actually boasts the world's largest output of tin. Even the United States, favored as it is with other resources in abundance, lacks tin, and depends on this region for its supply of this metal.

The oil industry in British Borneo and the Netherlands East Indies was started in 1889, its annual output of late being in excess of 8,000,000 tons. This amount comes only to somewhere around 3 per cent of the world's entire output of oil, which totals 280,000,000 tons. It is, however, no small amount, considering that Germany's consumption of oil at present amounts to approximately 7,000,000 tons a year and Italy's to 3,000,000 tons or thereabouts. No one could fail to see that the production of petroleum of such amounts has much to do with the welfare of a country. Particularly is it noteworthy that there should exist oil-fields of such productive capacity in the South Seas, which maintain special relations with Japan both geographically and economically. To this fact Japan should attach, indeed, great importance.

The Island of Borneo

Netherlands Borneo possesses the new Tertiary formation along its eastern coast and also in the southeastern parts, far inland. There are two oil-fields, one in the northernmost part of the region and the other in the southern part of the eastern littoral district. The former is situated on the small island of Tarakan, where oil output is estimated at 735,000 tons per annum. The latter extends toward Mahakkam River, the largest river in entire Borneo, as far as 50 miles, and consists of several oil-fields. The center of this oil zone is the Sangasanga Oil Field, where oil is produced to an annual amount of 985,000 tons.

The oil-fields in these regions were operated extensively at the beginning of the present century, but now are showing a tendency gradually to decrease their yields of oil. In British Borneo, the oil zone extends in the district facing the South China Sea. The oil-fields in actual operation are situated in Seria and Miri. The anticlinal of these oil-fields run from the land to the sea, and the turrets of the oil-wells are set up in the sea, though in some cases the new method of drilling oil-wells recently devised in the United States and suited to the special geological features

of this zone is employed. The oil yield of this zone is put at 914,000 tons. The total oil output of Borneo Island comes to 2,634,000 tons.

The Island of Java

In Java there are two oil-fields, both in the island's eastern part. One is situated far to the east and the other more centrally. The former has been developed in the outskirts of the port of Sourabaya and is called the Sourabaya Oil Field. It consists of six oil-wells. In this field the yield is from the new layer of the Tertiary formation. The latter field is situated in the vicinity of the port of Rembang, and is called the Remgang Oil Field. It consists of 12 wells. These two oil-fields, those of Sourabaya and Rembang, claim a total output of 934,000 tons per annum.

The Island of Sumatra

Of the oil-fields in the East Indies, the most important are found in Sumatra. The oil zone extends in the districts facing the South China Sea and the Strait of Malacca. But considering the fact that the new Tertiary formation develops throughout the greater part of the island, it may perhaps be taken for granted that, this region has the possibility of producing oil to a larger or lesser degree in all its parts. The present oil producing area is divided roughly into three districts, the southern, central and northern.

The oil-field in the northern part of the island is situated in the northern extremity, where ten oil-wells are in operation. This is commonly called the northern Sumatra Oil Field and claims an annual output of 905,000 tons. The one in the central part of the island, situated as it is in Djambi Province, is called the Djambi Oil Field, which having five oil-wells yields as much as 1,010,000 tons a year. The other, situated in the south, is called the Parembang Oil Field, as it is in Parembang Province. In this oil-field there are 19 wells, which yield 2,748,000 tons. Of this amount, the Talangakar wells belonging to the Netherlands Colonial Petroleum Company claim an output of approximately 2,000,000 tons. These thus occupy an enviable position as the oil-wells of the largest productive capacity throughout the South Seas.

The Island of Ceram

Three small oil-wells have been developed in the vicinity of the port of Boela on the northern coast, near the eastern extremity of this island, which lies to the east of Celebes Island. From this source but 82,000 tons of oil are obtained annually.

The total output of oil-fields in the South Seas, as detailed above, reaches 8,308,000 tons. Of this amount, 7,390,000 tons are produced in the Netherlands East Indies.

Quality and Management

It is important to examine the qualities of the different kinds of oil produced throughout the Netherlands East Indies. Examination shows that the oil produced from the Tarakan and Miri Oil-Fields is heavy, containing little, if any, gasoline, and is excellent as fuel. On the other hand, the oil produced in Sumatra is light and contains a large proportion of gasoline. South Sea oil, taken as a whole, contains an average of 35 or 36 per cent of gasoline.

It is also important to question the amounts of foreign investments in these oil resources. The answer is plain and simple. The oil industry in the South Seas is developed and managed almost entirely by British and American capital.

In Sumatra the oil industry was being undertaken after 1889, but the following year Dutch capitalists established a company to exploit the resources there. This was named the Royal Dutch Company. This company labored strenuously in the development of the oil-fields. Later, in response to the challenge by the Standard Oil Company of the United States and the Rothschild Oil Company of Russia, in their commercial war, the company decided to advance farther afield into the world oil markets, and combined into its fold the various other minor oil companies in the Netherlands' colonies. Then, taking in British capital, the company established the Royal Dutch Shell Corporation. Thus did it manoeuvre itself into monopolistic possession of the oil-fields in the East Indies.

With this as a stepping stone, it has since extended its scope of business activity into the oil resources of the world.

In the face of this advance of British capital into the world's oil markets, American oil interests have not by any means been looking on with folded arms. For instance, the Standard Oil Company of New Jersey established the Colonial Oil Company in 1912, and set about exploiting and developing the Talangakar Oil Field and oil resources in three other places. But, having failed to obtain any substantial results from that endeavor, the American company, late in 1919, offered to transfer its rights in the Talangakar Oil Field to the Japan Oil Joint Stock Company. The latter, intending to purchase the American rights, dispatched agents to make an investigation. The investigators drilled the wells to greater depths and accidentally discovered new and promising wells. But this closed the whole question of transfer of the American stake to a Japanese interest. These are the very fields which to-day are claimed to be the best in the South Seas, yielding 2,000,000 tons of oil a year. Indeed, Japan lost a rare chance to come by important oil resources.

The Colonial Oil Company, when despairing of the Talangakar Oil Field, applied to the Netherlands Government for permission to prospect and exploit the Djambi Oil Field. Taking in the situation, the Royal Dutch Company took prompt steps to establish the Netherlands East Indies Oil Company (N.I.A.M.) to cut the ground from under the feet of the American Company and thus frustrate its plans. The Netherlands Government has been requested to take up half the shares of this newly established oil company, but the right of control of the company now rests in the hands of Britain.

As mentioned in the foregoing, of the three oil companies in the East Indies, the Royal Dutch Company and N.I.A.M. are British in source and financial background, and the Colonial Oil Company is American. In addition, Britain actually holds under its control petroleum resources reaching the staggering total of 46,000,000 tons. America, too, is in no way behind Britain for it possesses almost inexhaustible oil resources within its own territory.

In conclusion we may examine the future of the oil resources in the South Seas. In this matter some sections of the public have been pessimistic mainly on the ground that the yields of the Miri and Tarakan Oil-Fields actually are decreasing. This view is not based on reason. For instance, the oil-fields in southern Sumatra have as many as 160 veins, but of these not even half are in actual operation. Then again, notwithstanding the fact that the oil-field at Djambi has 50 wells, only six of them at present are undergoing drilling operations. What is more, there actually have been instances where even old oil-wells have increased their yield through having been drilled farther down, as was the case with the Talangakar Field.

There still remain many prospective veins to be exploited, and if these are developed it certainly will mean very much. If the geological layers productive of petroleum, that is, the Tertiary formation in the various islands of the South Seas, are combed through exhaustively for oil, these resources surely will be available for 100 to 150 years to come. It is, thus, quite apparent that the oil resources of the South Seas have a promising future.

Especially to be noted is the fact that the greater part of these resources is to be found within the sphere of the Netherlands East Indies. It follows, therefore, that there will be a still greater production of oil than at present, depending on how the East Indies authorities put forth their efforts and use tact in developing the industry. Unfortunately, Japan lacks such important resources. Japan should, of course, endeavor to develop the oil-fields and to discover new ones in the Asiatic Continent through economic co-operation with China and on the principle of mutual existence and mutual prosperity. But at the same time, Japan should strive to obtain oil from the Netherlands East Indies through co-operation and an understanding with the latter and also on the principle of ministering to each other's wants. This latter measure is the shortest cut for Japan in obtaining her needed supplies of oil.

Progress of Industrial Research in the Philippines

(Continued from page 103)

The production of normal *butanol* and *acetone* from Philippine molasses and cassava has come to the realm of possibility, judging from the encouraging results of the investigations conducted by scientists in the laboratories of the Bureau of Science. Those

scientists explained that the two chemicals—*butanol* and *acetone*—are utilized widely by industrial firms abroad as solvents in the manufacture of explosives, lacquers, varnishes, dopes, and paints. The same chemicals are also used in preparing perfumes, pharmaceuticals, and esters.

Instead of sugar, Philippine starchy materials could be used also in the production of ethyl alcohol, which product is useful as motor fuel either in peace time or in war. This is shown in the studies made in the Philippine Bureau of Science.

The director of this scientific institution has not hidden his satisfaction in the refining and deodorizing of coconut oil as perfected in this Bureau because that oil has been tried successfully in canning fish in Iloilo. This locally refined and deodorized oil could be used, it has been pointed out, as a substitute for vegetable oils, such as Wesson oil, and Olive oil, which are being imported by the Philippines from abroad. The same refined oil is withal useful in the preparation of medicine and pharmaceutical products.

Pushing further the frontiers of industrial research, the 39-year-old scientific center—which was originally known as the Bureau of Government Laboratories—has built its own "pilot plant" for manufacturing new tanning extracts from various Philippine tanbarks and also for producing odorless leather, which is very much in demand by shoe manufacturers.

It is not a secret that considerable progress has crowned the painstaking efforts of the Islands' scientific emporium in producing other products such as, (1) linen-like fiber from the bark of a certain local forest wood, (2) high-grade and lustrous textile fiber from ramie, (3) alpha cellulose from various local fibrous materials particularly abaca waste, (4) pulp and hand-made paper from *ipil-ipil*, because, cogon, bamboo, and wild banana (*Canton*), (5) decolorizing carbon, black paint pigment, abrasive soap, and water glass from rice-hull ash; (6) fast dyes of different colors from sawdust of Philippine *Narra*, *Ipil* and *Tangile* woods; (7) commercial enzymes as well as acetic and other carboxylic acids from various kinds of local carbohydrates; (8) tiles (for house floor and bathroom) from rice-hull charcoal; and (9) lustrous fiber for high grade textiles from locally raised, crude ramie fiber.

The Bureau of Science has completed its studies on the economic uses of the wild banana (*Canton*) and is determinedly essaying to improve the still crude method of manufacturing saltfish (*bagong*), vinegar from nipa, sugar-cane juice, coconut palm "tuba," and *basi* wine from sugar-cane juice. Withal, the same government branch is studying the principal techniques used in the utilization of Philippine fruits in the manufacture of alcoholic liquors, not to mention its efforts to find local brick and pottery clays to promote the ceramics industry in this country.

The present director is the first Filipino to head the Bureau of Science, which, with its highly authoritative monthly *Journal of Science* and its Scientific Library—acclaimed as the best equipped of its kind west of the Suez Canal—is universally known and respected.

All the predecessors of the present Bureau director were Americans. The first head of the institution was Dr. Paul C. Freer who died in Manila in 1912. The last American head of the Bureau was a Botanist, Dr. William H. Brown who expired in the United States a few years ago. All the division chiefs except one (Dr. Augustus P. West) are Filipinos. Most of the staff members of the Bureau were educated in the University of the Philippines and in the leading institutions of the United States and Europe.

The Evolution of Dredgers

(Continued from page 94)

propeller in action, this stirred up the mud and drove the scoop deeper into the bank. It was then raised and taken out to deep water and discharged. The scoop carried about 15 tons of mud. He also describes a dredger, the invention of which must have been contemporary with the first cutter suction and with which it has several points in common. The dredger consisted of a vertical telescopic tube slung between two barges reaching down to the bed of the harbor and well stayed to the hull of the barges. At the lower end of the tube was a cutting screw which was driven by a steam engine through a vertical shaft. This screw cut the spoil and at the same time forced it up the vertical tube into a barge waiting alongside. This dredge was used in Chatham Dockyard. Several successful dredgers have been devised in which powerful jets of water have been used to stir up the mud, leaving the tide to carry the mud away.

Paracale Iron Mines in the Philippines

(The American Chamber of Commerce Journal, Manila)

THE Paracale Iron Mines, located in the gold mining district of the same name, gained third place among the major iron ore producers of the Philippines in 1939, and may come close to second place in 1940. Up to the middle of June the mine had shipped over 90,000 tons of iron ore, which was nearly as much as it had shipped during the whole year of 1939. It is now producing about 900 tons a day from the mine, as well as shipping an additional 600 tons a day from the stock-piles which are estimated to contain upwards of 50,000 tons.

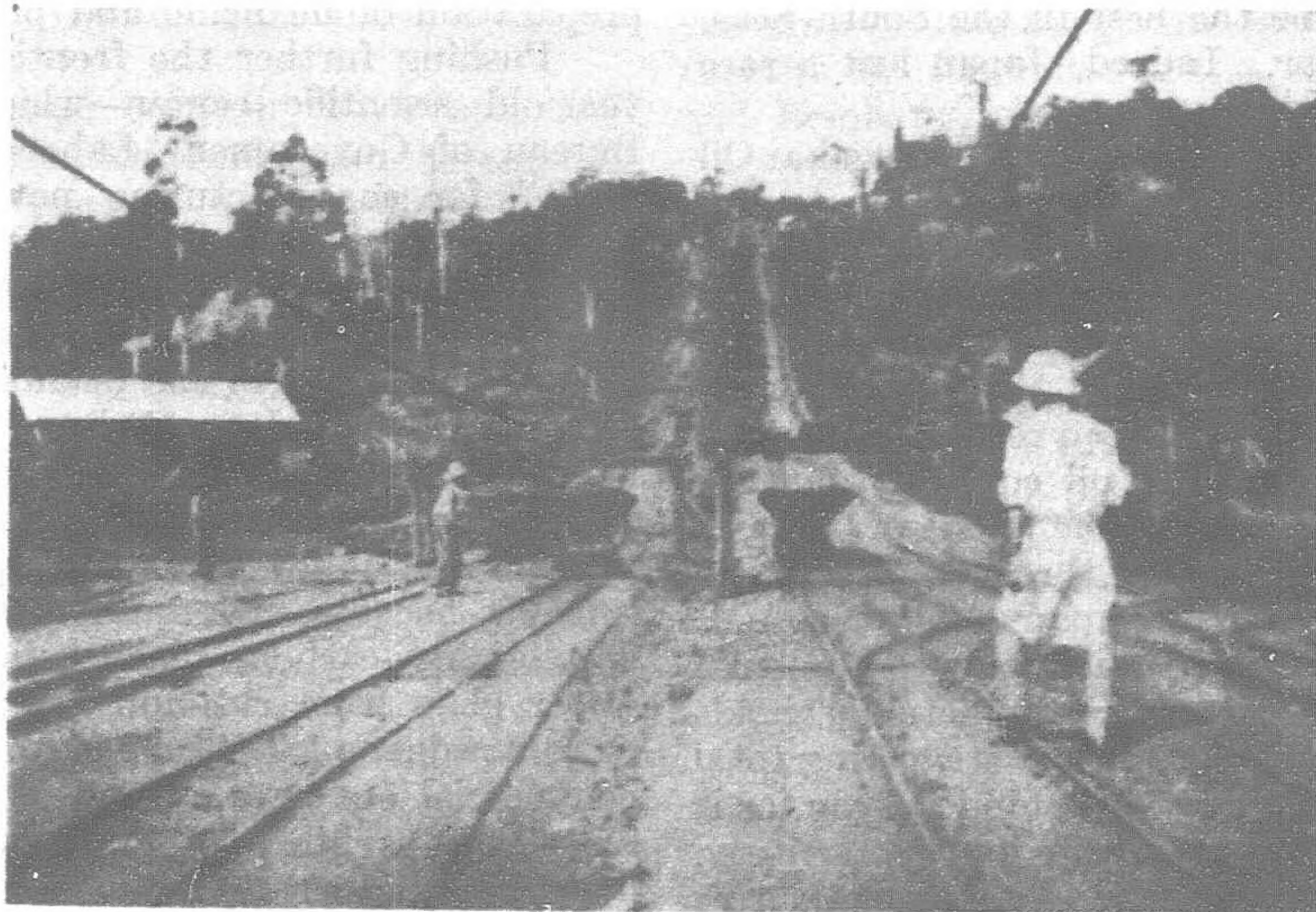
The property is owned by the Agusan Gold Mines, and has been leased to the Insular Mine Operators on a straight royalty basis, with the customary provisions that obtain in the usual mining lease in the United States. Japanese engineers, identified with the Insular Mines Operators, have been responsible for the mine development and equipment to its present stage. Early in 1938 a comprehensive program of trenching, tunnelling, and test pitting was laid out to determine the extent of the ore body. Development work was successful, and upwards of 1,000,000 tons of good grade iron ore, chiefly magnetite and hematite, were reasonably well delimited. Actual shipments of iron ore to date have checked the estimates of the engineers quite closely as to grade, which during 1939, averaged over 64 per cent iron, and 2.2 per cent silica. This is first class iron ore anywhere.

The mine is located south-east of the Batobalani-Paracale main highway, on the south side of the Malaguit River. From the mine to the river there are about 2.5 kilometers of flat country, across

which it has been comparatively easy to build a narrow gage rail-road. Four Diesel locomotives are in constant service over it, each locomotive pulling a train of twenty-five 1½-ton ore cars from the mine to the river, where a pier has been built from which the ore cars are dumped directly into the lighters for transport to an ocean freighter.

The Malaguit River meanders lazily through the lowlands for some four or five kilometers before reaching Paracale Bay. Al-

though quite wide, it has shallow depth, and lighters can be towed up the river to the mining company's pier only at high tide. The company has 14 lighters and while these are of fair size, they can accommodate only 100 tons of ore each on account of low water most of the time. To add to shipping troubles, the typhoon season in Paracale starts in November and continues for several months, and during this period transferring ore from lighter to ship is virtually impossible. Consequently the mine operators are forced to stockpile the ore until shipments can be resumed. However, due to efficient arrangements, once loading ore is begun it can be carried out in surprisingly short time with a

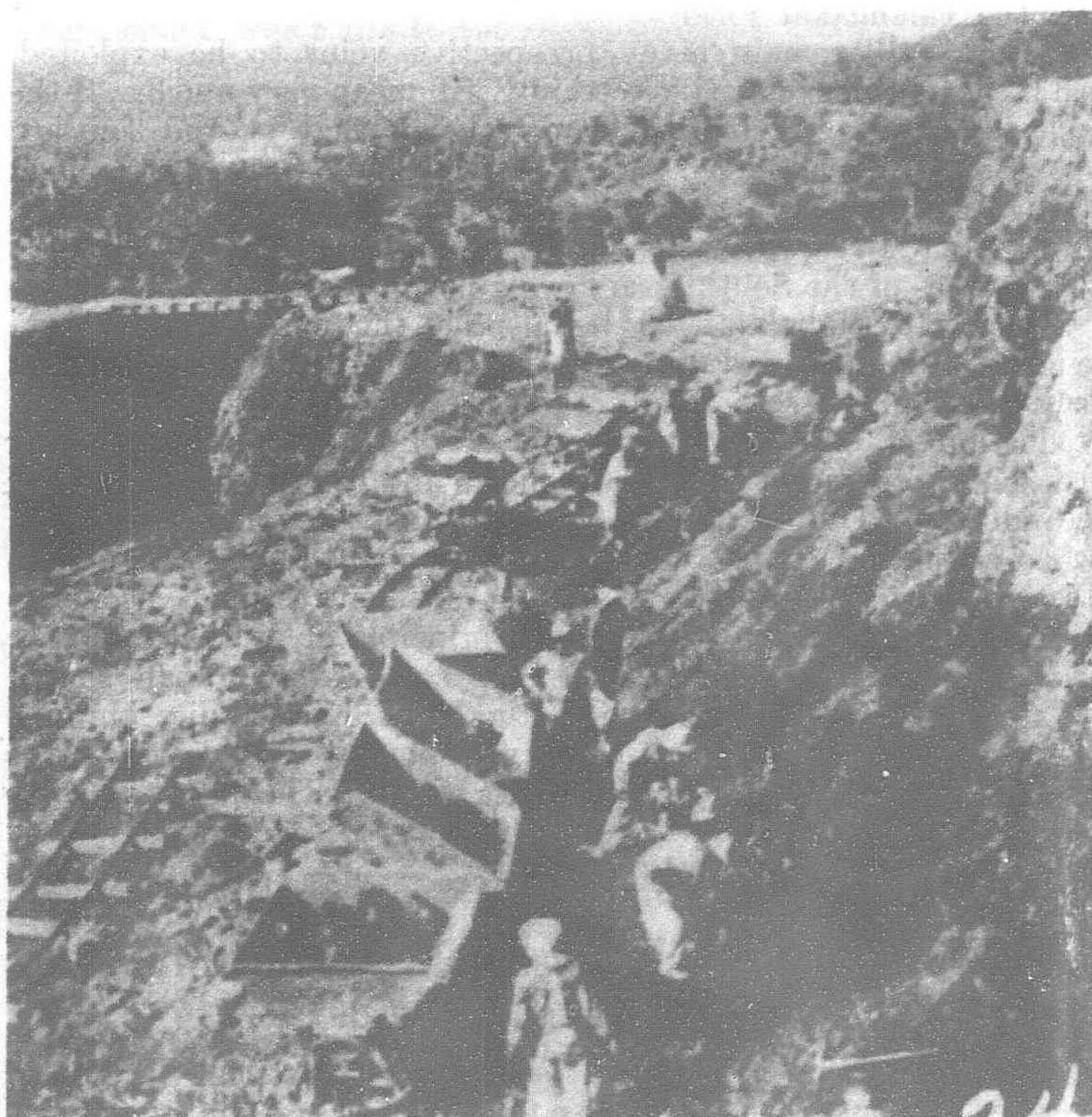


Gravity trams and transfer station; mine is on top of hill

minimum of handling.

The ore body which lies close to the surface and extends north-westerly in a generally lenticular form, is mined by conventional open-cut methods, employing the bench system, such as has been used so successfully at the great porphyry copper mines in Arizona and Utah, as well as at Mesabi. The overburden is first removed

(Continued on page 108)



Mining high grade ore at Paracale iron mines in the Philippines

TIN

(British Malaya)

THE history of tin is the story of civilisation, which first developed in the East, where the value and uses of tin were discovered. From there it spread slowly westward, enabling the peoples who understood the uses of tin to have domination over their less advanced neighbours. The Greek word for tin, "cassiteros," is presumed to be derived from an Indian word that means "to shine." But it was not usefulness as mirrors that made tin so valuable to the ancients, but the hardening quality of copper, enabling them to make the alloys known as bronzes, which were to them what iron and steel are to us to-day. Every one remembers from his school days that the Phoenicians came all the way to Britain for tin; it is not so well remembered that the Greek name for our islands was "Cassiterides," the Tin-bearing Islands. In the second century B.C. a Greek historian wrote of Cornwall, "The inhabitants of that extremity (of Britain) prepare tin, working the earth which yields it with great skill."

With the discovery of iron, and later of steel, we see tin losing its prime importance as a material of weapons of war and of agricultural implements, but throughout the Middle Ages it retained domestic usefulness as the principal ingredient of pewter, of which most jugs, drinking vessels, dishes and plates were made as lately as two hundred years ago.

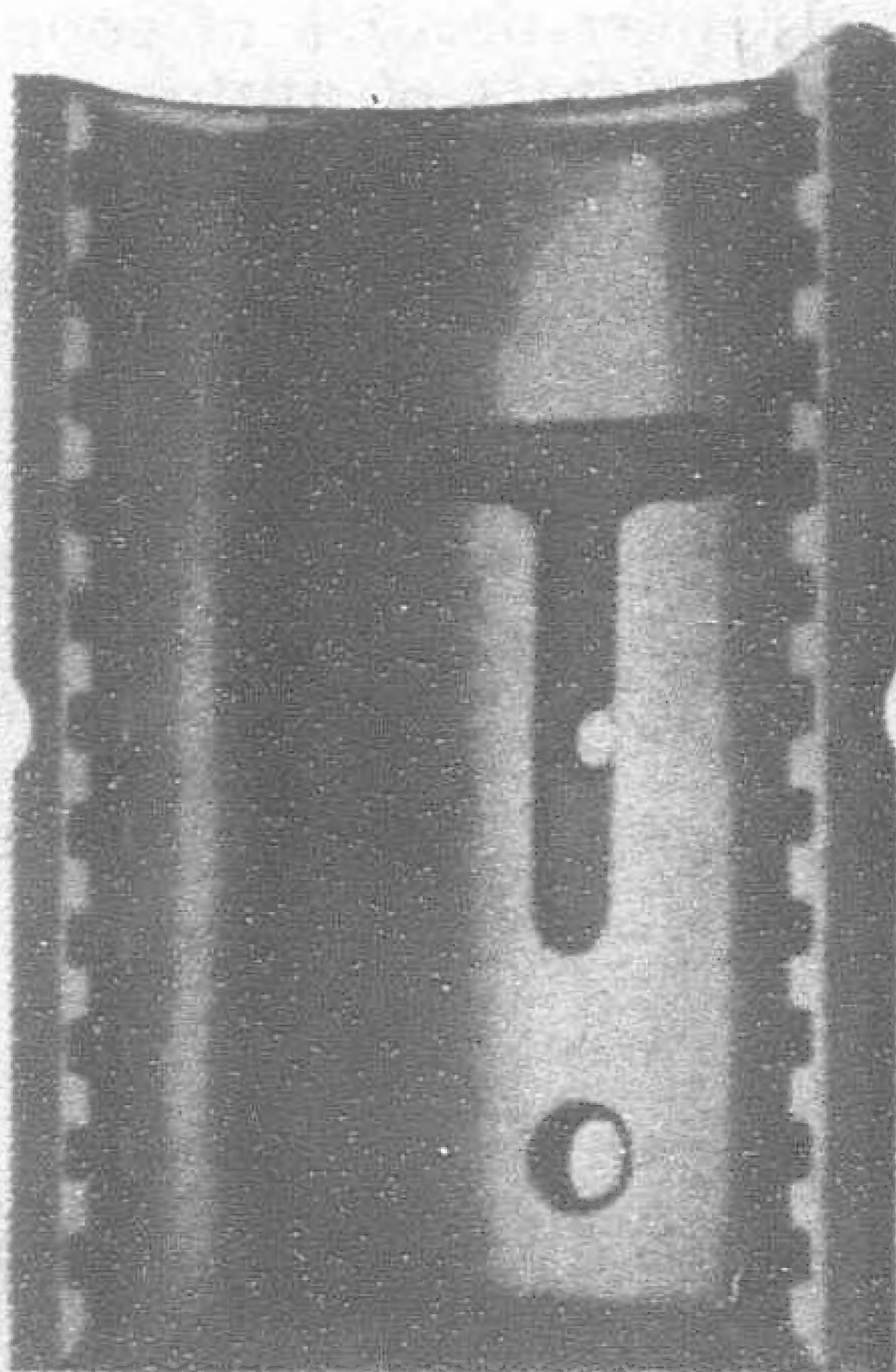
Although tin lost this form of domestic application with the growing use of earthenware, china and glass, it became again of importance when the manufacture of tinplate was perfected. Without this discovery a host of modern requirements would be difficult and costly to satisfy. The tinplate industry is to-day one of primary importance and vast proportions; in South Wales alone it uses over one million tons of steel and sixteen thousand tons of tin each year. When it is remembered that the tin on the sheets that make our "tin" cans, petrol tins, etc., is only one ten-thousandth of an inch thick, the output of tinplate can be imagined! Man's ingenuity is no better exemplified than by his uses of tin; it is a basis of some of the most beautiful colors on silk, wool and cotton that the dyer produces.

It is, however, in the use of tin in modern engineering that its value is paramount, for no substitute for it in certain instances exists. This is due to the physical quality of smoothness, known as the anti-frictional quality, the resistance to wear, and the ease with which tin can be melted, cast and machined; also, the fact that it does not "sweat." In consequence, tin is the principal ingredient of the bearings of most high-speed power machinery. Without tin such modern inventions as high-speed aeroplanes, automobiles, power speed boats, etc., could not be made, for there is no other metal that can resist the tremendous forces of their reciprocating engines and yet have the anti-frictional qualities which are necessary in the close-fitting bearings in these machines.

We see, therefore, with the advances in the design and power loading of modern power units, the research and constant ex-

periment of over forty years in the field of engine bearings. Twenty-five years ago the speeds of reciprocating engines were 800 to 2,000 r.p.m. To-day they reach 5,000 to 6,000 r.p.m. Instead of steel connecting rods of large diameter, alloy connecting rods of much lighter construction are used which necessitate much closer fitting of the bearings. All these factors call for qualities of bearings undreamed of only a generation ago, and to-day we find every factor considered and a range of bearing metals available that meets all the various requirements.

The originator of white-metal anti-frictional bearings with tin as the basis was an American named Henry Babbitt, who compounded tin with copper and sold his alloys under the name "Babbitt metal." Imitators soon arose, not so scrupulous, who cheapened the cost of their anti-frictional metals by embodying in them the cheaper metal lead, and it is a strange thing to-day that the term Babbitt metal connotes, in U.S.A., a metal whose base is lead. Tin-base metals are termed "genuine Babbitt!"



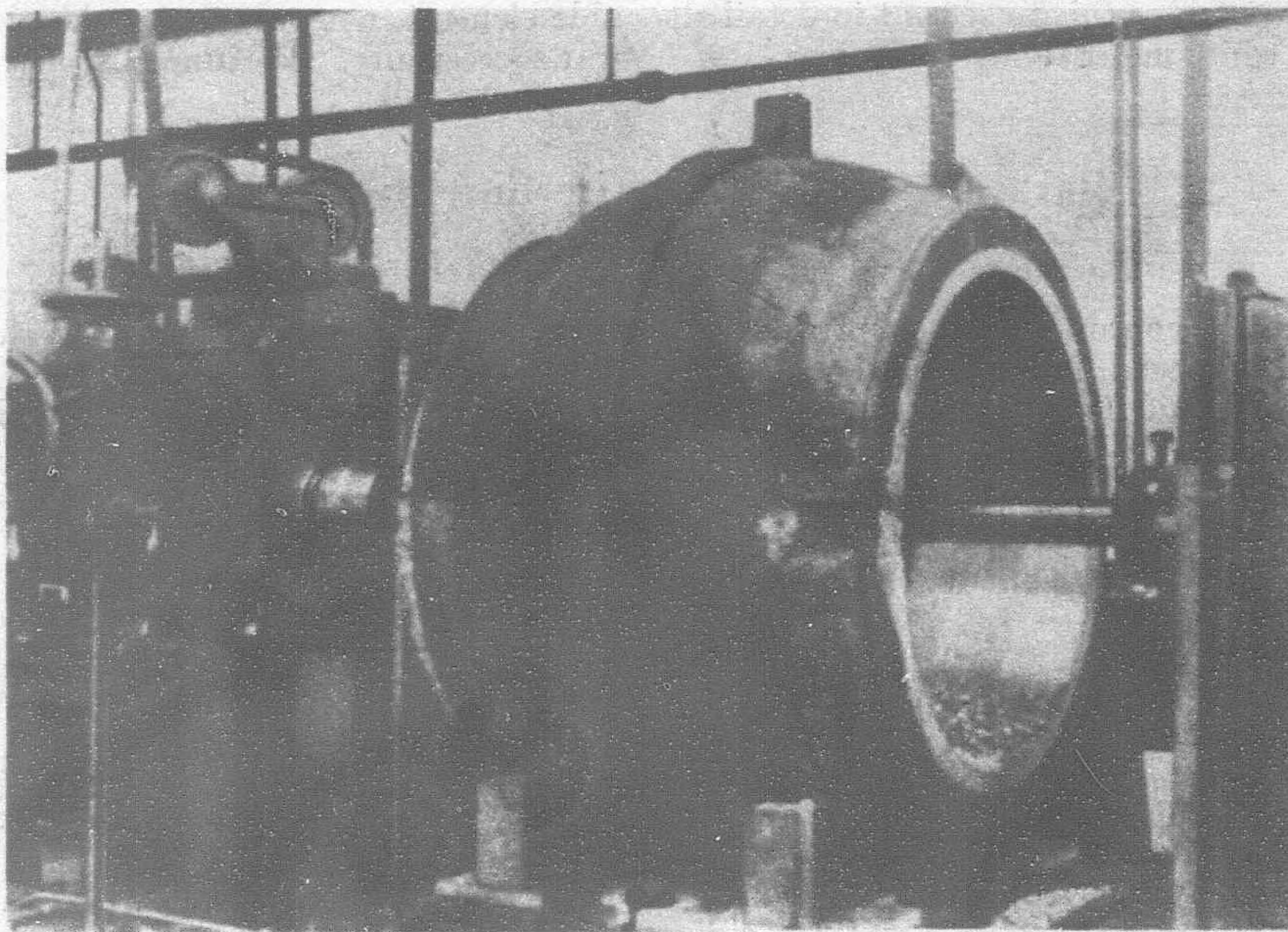
Half bearing for automobile engines, bronze shell lined with white metal

The growth of the automobile and aircraft industries has seen a corresponding growth in the production of bearing metals, and from this has developed a specialized business: the manufacture of finished bearings. These two run naturally hand in hand, and the reader will gather that the makers of modern power units prefer not to make their own bearings, but to use those supplied to them by firms who specialize in this highly technical business. The activities of a typical firm, such as the Glacier Metal Company, of Alpertown, near London, the largest makers of bearings and bearing metals in Europe, is set out to this end. This firm, founded by the American Cuyler Whittle Findlay at the beginning of this century

with half-a-dozen men, in the days of the infancy of the motor-car, has grown to an organization approaching 1,500 persons and with an output of bearing metals running to thousands of tons each year, and of finished bearings to approximately ten millions! The growth of the firm can be attributed primarily to insistence that in its bearing-metal alloys pure metals only shall be used. The reason for this is that impurities in a metal affect the physical characteristics and it is impossible to blend impure metals and produce an alloy whose character and behaviour can be predicted. The Glacier Metal Company can and does guarantee the composition and behavior of its alloys because the compositions are firstly,

known, and secondly, scientifically controlled in the manufacture.

At the one end of the vast Glacier factory is the foundry where the melts are made. The furnaces, gas-fired, are electrically controlled and the progress of each melt is electrically recorded in the control room. Each batch is analysed in the chemical laboratory for adherence to specification, and samples of the metals are made up into bearings and tested under practical working conditions. Thus the various standard metals are produced and special alloys to customers' own specifications are analysed and tested likewise to ensure that they give the performance required.



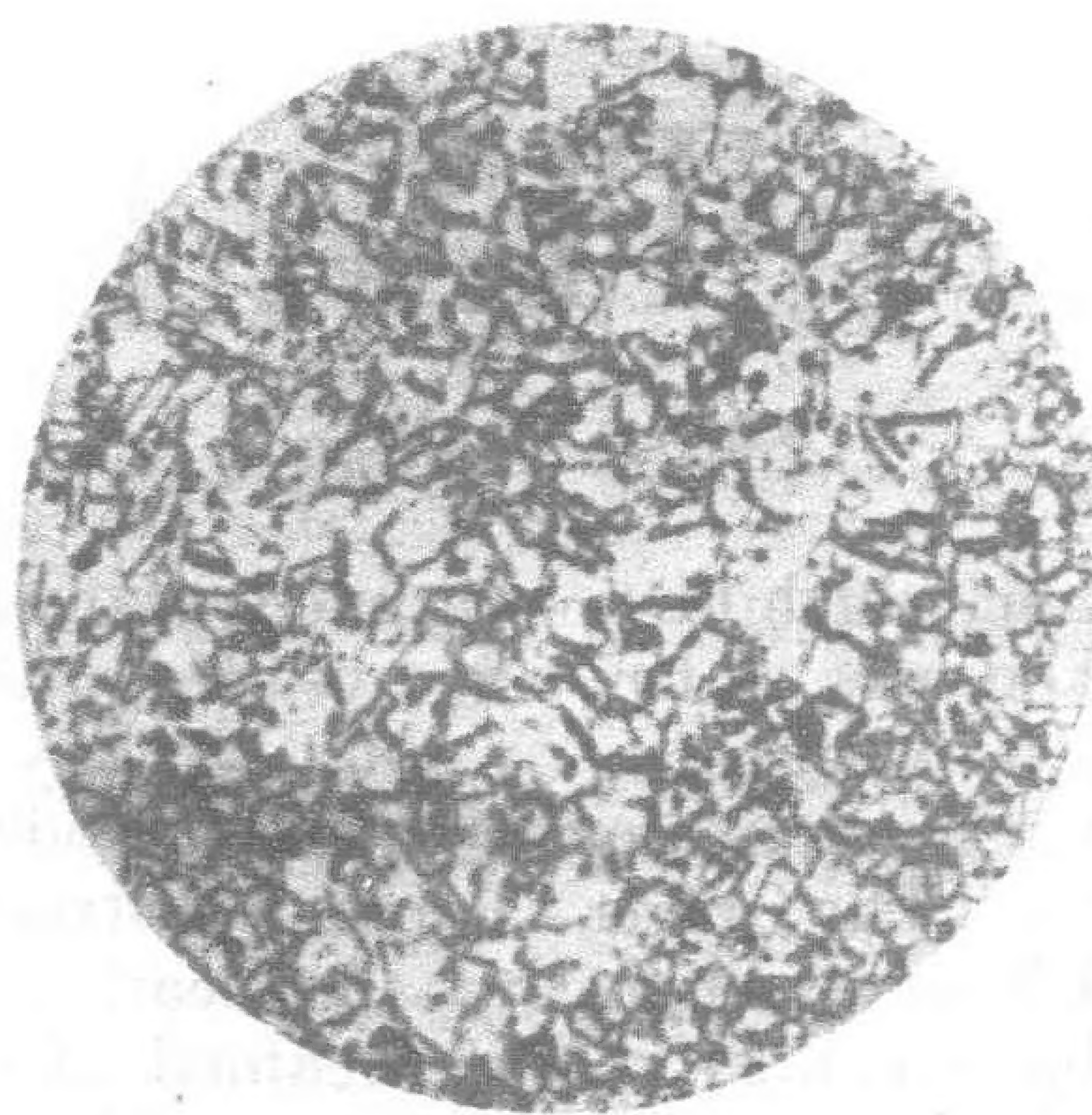
Cement mill bearing remetalled and machined

The most widely used tin-base anti-frictional metals made by the Glacier Metal Company are Findlay's Motor Metal L.1, containing approximately 87 per cent of tin and technically free from lead, and Findlay's Motor Metal H.C.1, containing approximately 83 per cent of tin and with a proportion of cadmium to increase fatigue resistance. The former metal is the premier Glacier white-metal alloy. It is used for aero-engines, automobile engines, air compressors, crushing machinery, low-powered Diesel engines, locomotives, pumps, turbines and high-speed reciprocating machinery generally. H.C.1 alloy is designed for high-powered Diesel engines, heavy electrical machinery, rolling mills, etc.

Tin-base metals are naturally expensive, and to meet the needs of other branches of engineering where less stringent conditions are found, the Glacier Metal Company has a range of eighteen different standard white-metal alloys. The one with the widest applications is "Standard Glacier Metal." This tin-lead base alloy is used in rotary machinery working under high speeds and at heavy pressures where the bearings are of large area. The range of its applications is too large to set out and includes cement works plant, colliery and mining motors and pumps, crushing machinery, threshers, tram-car bearings, railway axle boxes, etc.

It will have been noticed that lead is used in conjunction with tin in alloys where the most stringent service conditions are not present. The presence of lead is a disability in heavy-duty bearings of relatively small area because it forms "eutectic" mixtures which sweat under high temperatures. Impurities in even minute proportions prevent the correct crystalline structure on which the performance of a bearing metal is based. In the photomicrograph, magnification 100 times of a piece of Findlay's Motor Metal L.1, which contains 87 per cent of tin, eight per cent of copper and some antimony, will be noticed cuboid-shaped crystals which are a tin-antimony alloy, separated by needle-shaped crystals of copper-tin. The dark mass, known as the matrix, is pure tin. When this alloy is poured into the moulds of a bearing and cools, the copper-tin crystals separate out first, and between them the tin-antimony cuboids are formed. If any impurities are present, the crystalline formation will be upset and the cuboids, which form the wear-resisting surface, will be irregularly spaced or even almost non-existent.

It is impossible in an article such as this to set out in detail all the different applications of white-metal alloys. Glacier Rope



Microphotograph—Magnification x 100—of Findlay's motor metal showing a perfectly satisfactory technique of casting with a rich ground mass of tin support-needles of copper and crystals of antimony



Rolling mill bearing lined with 2½ cwts. white metal

Capping Metal B.S.I. Spec. 643 is made to the requirements of the Colliery Managers' Association; Glacier Marine metals are widely used in H.M. Navy. Glacier G.R.2 is much used in railway work, hydraulic cranes, etc.; Glacier T.1 for electric dynamos.

The dictates of cheapness and reduction of weight have resulted in the change from heavy cast shell bearings with comparatively thick antifrictional linings to thin steel shells with a lining only a few thousandths of an inch thick. The art of making these bearings is based on a high degree of accuracy and of satisfactory bonding of the shell and the liner. In the Glacier factory every type of bearing is made, from large marine bearings to the smallest motor-cycle bearing, and it is interesting to follow the processes of manufacture.

In the case of steel shell bearings, up to ¼-in. thick, the shell is blanked off from the strip, bent (in two operations in the thicker sizes) and the flanges pressed. It is turned to exact size after the holes have been pierced, and trimmed. The shell is then whitewashed on the outside to prevent the bonding metal adhering and tinned on the inside. The bearing is then placed in a mould and the lining metal forced in under pressure. After cooling, the radii of the flanges are turned, the back of the shell is ground to dead size, and the bearing surface is roughly turned down and then finished to a satin surface on a diamond cutter. The oil grooves are cut before the final finishing. These are offset to ensure the oil being spread over the area between the grooves. The edges of the grooves must be well rounded off to prevent the

picking up of scrapings, etc., which will choke the oil ways. The last stage of a bearing is the examination, in which the most exacting standards are maintained with the aid of special devices.

And so the bearings pass out, to be incorporated in their respective machines. If they are of the cast-shell variety, they can be re-lined when necessary, and it is obviously an advantage to do so with the metals specified by the actual machine makers. In the case of thin steel shell bearings where special appliances and expert experience are necessary for successful lining, it is advantageous to use replacement bearings which are identical with the originals in the machine.

Tin has always been, and probably always will be, an irreplaceable element, not only to provide domestic amenities, but to wage war successfully. Fortunate is the country that produces it.

Paracale Iron Mines in the Philippines

(Continued from page 106)

and run off to one side, for which the contour of the country is well adapted. When the ore body is exposed, it is attacked with pick and drills, operations being about equally divided between hand and mechanical methods. Most of the work is contracted, and excellent production cost figures have been achieved. The ore from the main ore body is hard, massive, lump material that requires no beneficiation before shipment. It is loaded into cars, trammed to a central station, then sent down the hill over a series of gravity planes, whereby the loaded descending car of ore pulls up the empty one. No power of any kind is required, and the only duty of the attendant is to manipulate a huge brake on the drum.

However, a considerable proportion of the ore reserve consists of boulder or wash ore, which has apparently been torn loose by erosion from the outcrop and carried down the slope. This ore, after being mined, must be washed to free it from the soil and bring it up to shipping grade. For this purpose the company has built a washing plant of some 350 tons capacity per eight hours. As

water is scarce, the wash water is allowed to settle, then pumped back for re-use.

The iron ore as noted is a highgrade hematite or magnetite. The latter may be easily distinguished by its pronounced magnetic properties. If a small pocket compass is brought near a specimen of magnetite, the needle swings round in wild excitement, like a thing alive. Of course, compass bearings are useless in the vicinity.

About 960 men are employed on the property, of which some 700 are engaged in mining and stripping the ore. A well laid out camp is maintained for the native workers. While the camp can make no pretense to compare in size with its big neighbor at Larap, the Philippine Iron Mines, it is adequate for present needs. Large sums have been invested by the leasers in surface improvements and equipment.

Ore reserves, as estimated by the engineers of the leasing company, are sufficient to support the present scale of operations for several years.